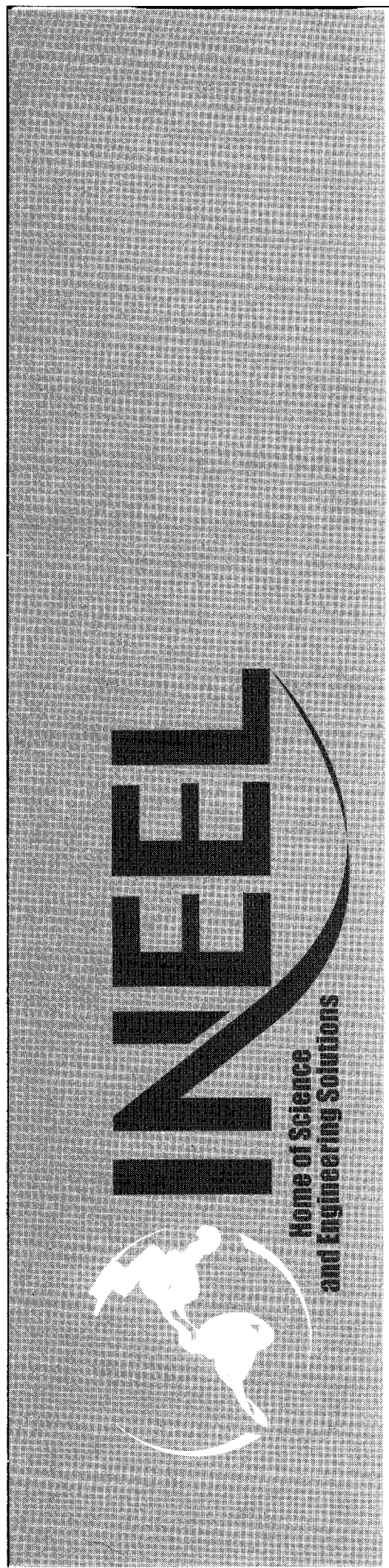
INEEL/EXT-02-00528
Revision 0

Health and Safety Plan for the CFA-04 Mercury Pond Sampling and Remedial Action

Jonathan D. Roberts
June 2002



Idaho National Engineering and Environmental Laboratory
Bechtel BWXT Idaho, LLC

INEEL/EXT-02-00528
Revision 0

Health and Safety Plan for the CFA-04 Mercury Pond Sampling and Remedial Action

Jonathan D. Roberts

June 2002

Idaho National Engineering and Environmental Laboratory
Environmental Restoration Program
Idaho Falls, Idaho 83415

Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
Under DOE Idaho Operations Office
Contract DE-AC07-99ID13727

Health and Safety Plan for the CFA-04 Mercury Pond Sampling and Remedial Action

INEEL/EXT-02-00528
Revision 0

June 2002

Approved by

Stephen G. Wilkinson
Bechtel BWXT Idaho, LLC
WAG 4 Project Manager

6/18/02
Date

Douglas H. Preussner
Bechtel BWXT Idaho, LLC
WAG 4 Project Engineer

6/18/02
Date

ABSTRACT

This health and safety plan (HASP) establishes the procedures and requirements that will be used to eliminate or minimize health and safety risks to personnel working at the Central Facilities Area (CFA) -04 mercury pond sampling and remedial action site, as required by the Occupational Safety and Health Administration standard, "Hazardous Waste Operations and Emergency Response" (29 Code of Federal Regulations 1910.120). This HASP contains information about the hazards involved in performing the work as well as the specific actions and equipment that will be used to protect personnel while working at the task site.

This HASP is intended to give safety and health professionals the flexibility to establish and modify site safety and health procedures throughout the entire span of site operations based on the existing and anticipated hazards.

CONTENTS

FIGURES

TABLES

ACRONYMS

ACGIH	American Conference of Government Industrial Hygienists
ACM	asbestos-containing material
ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
ARDC	Administrative Record and Document Control
CAM	continuous air monitor
CEL	Chemical Engineering Laboratory
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
CPR	cardiopulmonary resuscitation
CRC	contamination reduction corridor
CRZ	contamination reduction zone
DAR	Document Action Request
dBA	decibel A-weighted
DMCS	Document Management Control System
DOE	Department of Energy
DOE-ID	Department of Energy Idaho Operations Office
ERO	Emergency Response Organization
FTL	field team leader
GDE	guide
HASP	health and safety plan
HAZWOPER	hazardous waste operations and emergency response
HEPA	high-efficiency particulate air
HSO	health and safety officer

IARC	International Agency for Research on Cancer
INEEL	Idaho National Engineering and Environmental Laboratory
ISMS	Integrated Safety Management System
JSA	job safety analysis
MCP	management control procedure
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
NRR	noise reduction rating
NTP	National Toxicology Program
OMP	Occupational Medical Program
OSHA	Occupational Safety and Health Administration
OU	operable unit
PEL	permissible exposure limit
PLN	plan
POD	plan of the day
PPE	personal protective equipment
PRD	program requirements document
RadCon	Radiological Control
RCT	radiological control technician
RCRA	Resource Conservation and Recovery Act
RI/FS	remedial investigation/feasibility study
RWP	radiological work permit
SAD	site area director
SCBA	self-contained breathing apparatus
STD	standard
TLV	threshold-limit value

TPR	technical procedure
TRAIN	Training Records and Information Network
TWA	time-weighted average
UV	ultraviolet light
VPP	Voluntary Protection Program
WAG	waste area group
WCC	Warning Communications Center

Health and Safety Plan for the CFA-04 Mercury Pond Sampling and Remedial Action

1. INTRODUCTION

1.1 Purpose

This health and safety plan (HASP) establishes the procedures and requirements that will be used to eliminate or minimize health and safety hazards to personnel working at the Central Facilities Area (CFA) -04 mercury pond sampling and remedial action site at the Idaho National Engineering and Environmental Laboratory (INEEL). Figure 1-1 shows the location of the INEEL and its primary facilities.

1.2 Scope and Objectives

This HASP has been written to meet the requirements of the Occupational Safety and Health Administration (OSHA) standard, "Hazardous Waste Operations and Emergency Response (HAZWOPER)" (29 Code of Federal Regulations [CFR] 1910.120). This HASP governs all work at the CFA-04 mercury pond sampling and remedial action site that is performed by INEEL management and operations contractor personnel, subcontractors, and any other personnel who enter the project area. The project scope covers both pre-remedial sampling and remedial action activities, as discussed in the sections below.

This HASP has been reviewed and revised as deemed appropriate by the health and safety officer (HSO) in conjunction with other project personnel and management to ensure its effectiveness and suitability.

1.3 Idaho National Engineering and Environmental Laboratory Site Description

The INEEL, formerly the National Reactor Testing Station, encompasses 569,135 acres (230,321 hectares) and is located approximately 55 km (34 mi) west of Idaho Falls, Idaho. The Department of Energy Idaho Operations Office (DOE-ID) has responsibility for the INEEL and designates authority to operate the INEEL to government management and operating contractors.

The United States Atomic Energy Commission, now the Department of Energy (DOE), established the National Reactor Testing Station (now the INEEL) in 1949 as a site for building and testing a variety of nuclear facilities. The INEEL has also been the storage facility for transuranic radionuclides and radioactive low-level waste since 1952. At present, the INEEL supports the engineering and operations efforts of DOE and other federal agencies in areas of nuclear safety research, reactor development, reactor operations and training, nuclear defense materials production, waste management technology development, energy technology and conservation programs, and DOE long-term stewardship programs.

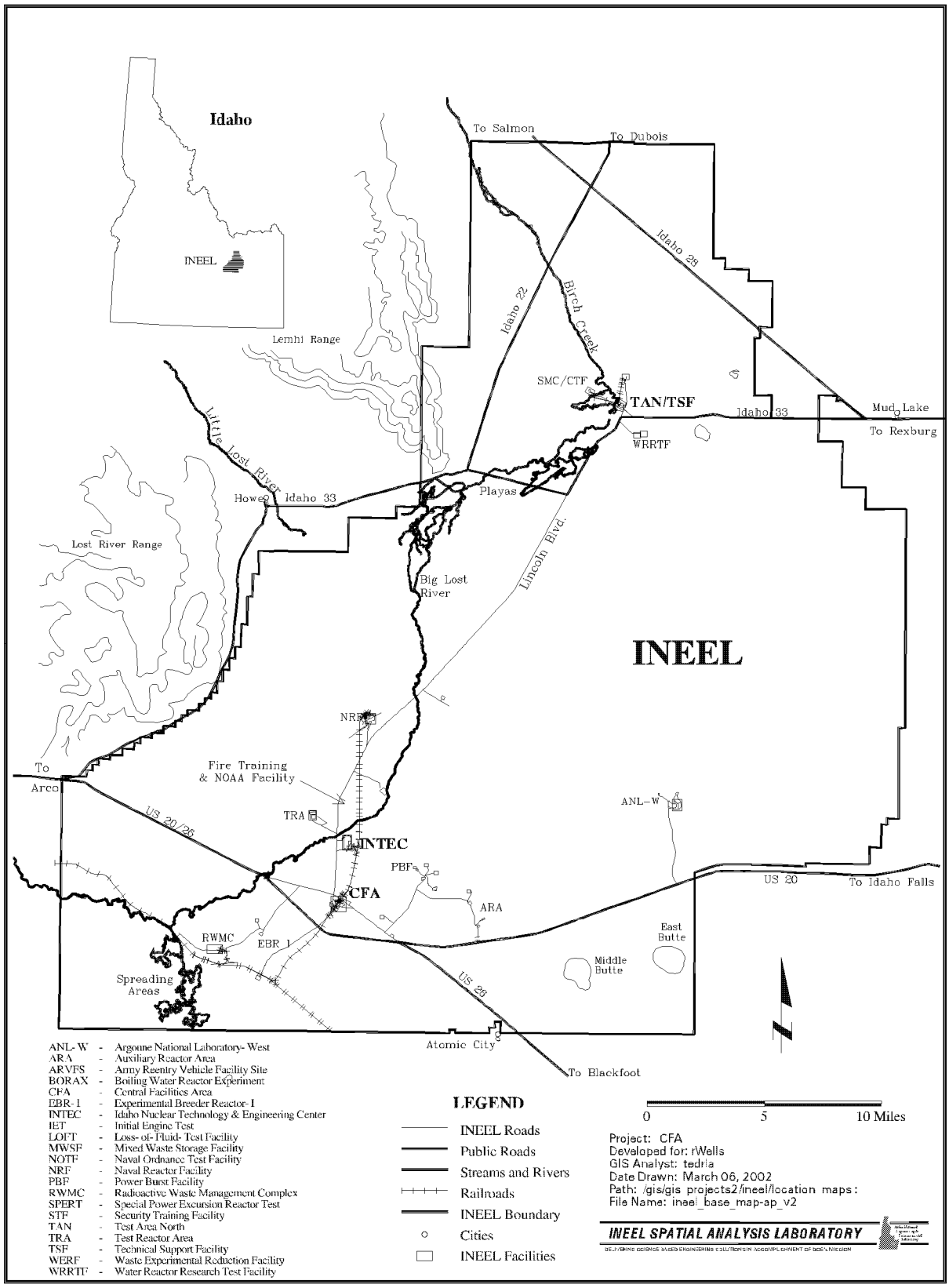


Figure 1-1. Map of the Idaho National Engineering and Environmental Laboratory.

1.4 Background and Project Site Description

The CFA-04 pond is a shallow, unlined surface depression that was originally a borrow pit for construction activities at the CFA (Figure 1-2). It is approximately 46 × 152 m (150 × 500 ft) and roughly 2 to 2.4 m (7 to 8 ft) deep. Basalt outcrops are present within and immediately adjacent to the pond. It received laboratory wastes from the Chemical Engineering Laboratory (CEL) in Building CFA-674 between 1953 and 1969. The CEL was used to conduct calcine experiments on simulated nuclear wastes. The calcining process was later used on actual nuclear wastes at the INEEL to change them from a liquid to a solid and to effect an overall volume reduction. The CEL experiments used mercury to dissolve simulated aluminum fuel cladding as well as radioisotope tracers in the calcining process. The primary waste streams discharged to the pond from the CEL included approximately 76.5 m^3 (100 yd^3) of mercury-contaminated calcine that contained low-level radioactive wastes and liquid effluent from the laboratory experiments. In addition, there is approximately 382 m^3 (500 yd^3) of rubble consisting of laboratory bottles, asphalt and asbestos roofing materials, reinforced concrete, and construction and demolition debris. The pond received run-off from the CFA site periodically between 1953 and 1995.

1.4.1 Previous Remediation Efforts and Investigations

The CFA-04 pond was identified as a Track 2 investigation site in the *Federal Facility Agreement and Consent Order* (DOE-ID 1991). Visual inspections in 1994 revealed the presence of calcine on the bermed areas around the periphery of the pond. Following surface and subsurface soil data collection from the calcine and the pond berm in early and mid-1994, a time-critical removal action in September 1994 excavated approximately 218 m^3 (285 yd^3) of calcine and calcine-contaminated soil and a small amount of asbestos from the bermed area. The soil was remediated at a portable retort set up northeast of the pond. Verification soil sampling conducted after the removal action showed that the bermed areas had residual mercury concentrations up to 233 mg/kg.

During the 1995 Track 2 investigation, additional soil samples were collected from the pond inlet area, as well as a deeper area of the pond near the inlet where laboratory effluent may have collected. The results of the 1994 and 1995 soil investigations revealed that concentrations of the following constituents exceeded background concentrations for the INEEL: aluminum, arsenic, barium, cadmium, calcium, chromium, cobalt, lead, magnesium, mercury, nickel, Cs-137, Pa-234m, Sr-90, Th-234, U-234, U-235, and U-238. Aroclor-1254 was also detected at low levels. Preliminary risk screening indicated that the following constituents detected at the pond posed potential human health risks: aroclor-1254, arsenic, mercury, Cs-137, U-234, U-235, and U-238. The range of detected concentrations of arsenic was 3.1 to 22.4 mg/kg; mercury, 0.12 to 439 mg/kg; Cs-137, 0.0742 to 2 pCi/g; U-234, 0.651 to 22.6 pCi/g; U-235, 0.0225 to 1.6 pCi/g; and U-238, 0.73 to 35 pCi/g. Based upon these data, the site was recommended for further characterization in the Operable Unit (OU) 4-13 Remedial Investigation/Feasibility Study (RI/FS) (DOE-ID 1996).

Additional soil samples were collected for the OU 4-13 RI/FS during 1997 and 1998 at four areas along the length of the pipe connecting the CEL to the pond, in the area northeast of the pond known as the wind-blown area, and from the pond bottom. Data from these investigations confirmed the presence of mercury in these areas at concentrations up to 439 mg/kg. Four of the 88 samples exceeded the mercury Resource Conservation and Recovery Act (RCRA) characteristic hazardous waste level of 0.2 mg/L. Three of the four samples were in close proximity to one another in the pond and the fourth was an isolated occurrence in the wind-blown area and was eliminated. A contour line was drawn around the three closely spaced samples and the area was estimated. The depth of the soil in the pond was conservatively estimated to be 2.4 m (8 ft) in the pond bottom and 0.15 m (0.5 ft) in the wind-blown area, indicating that approximately 612 m^3 (800 yd^3) of soil is potentially characteristic waste per RCRA and is subject to land disposal restrictions upon excavation.

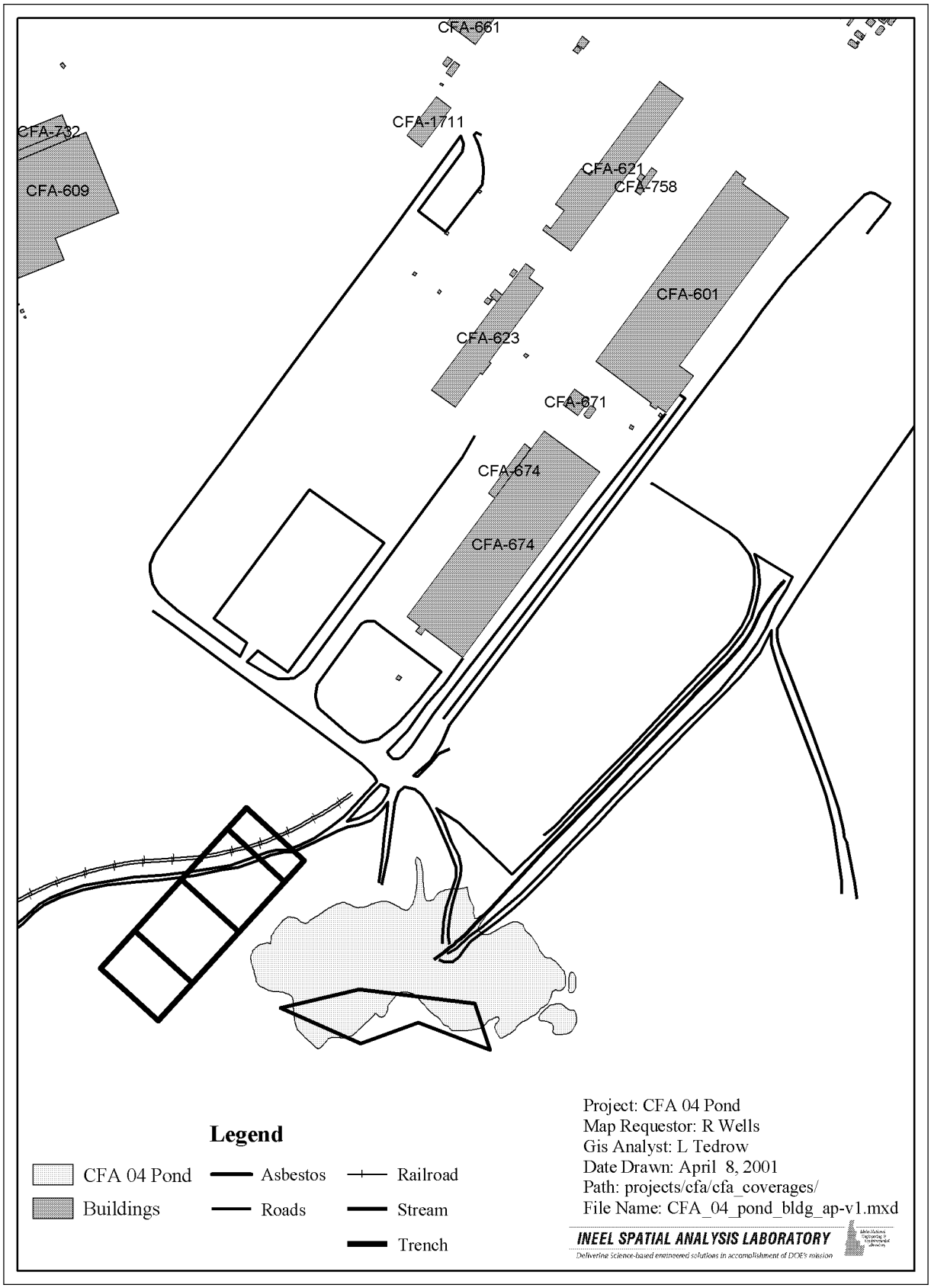


Figure 1-2. CFA-04 pond.

The only contaminant that poses an unacceptable risk to human health and the environment is mercury. Mercury-contaminated soil is present in the pond bottom, around the pond periphery in the berms, along the pipe connecting the CEL to the pond, and in the area northeast of the pond as a result of wind-blown contamination, an area encompassing approximately 91 × 183 m (300 × 600 ft). The OU 4-13 RI/FS conservatively estimated the volume of mercury-contaminated soil to be approximately 6,338 m^3 (8,290 yd^3), based on the dimensions of the pond bottoms, wind-blown area, and pipeline at depths of 2.4 m (8 ft), 0.15 m (0.5 ft), and 1.8 m (6 ft), respectively.

1.4.2 Buried Asbestos

Building CFA-601 was constructed in 1950 and Building CFA-674 was constructed in 1951. Reference construction, remodeling, and repair drawings identify that work was performed on the roofs of these buildings several times during the period from construction until 1982. Other photographs and architectural drawings identify that there were several roofing patch jobs from 1953 to 1967. Building construction drawings show that the built up roof on each building was about 5 cm (2 in.) thick as designed (4 or 5 ply of roofing felt on 1.5-in. thick insulation). The buildings' proximity to the pond area and the fact that the buried material appears to match construction document specifications, and is definitely roofing material, has led to the supposition that the source of the material is roofing replacements from one or both of these buildings during one or more periods.

If it is postulated that the material from a total re-roofing of each building, and all the identified roofing repairs, was deposited in the CFA-04 pond and then subsequently buried, the amount of asbestos-containing material (ACM) would total approximately 550 m^3 (750 yd^3). The volume of material requiring excavation and repackaging for proper disposal will include roofing material and soils. The volume excavated should not exceed the total buried waste and soil area of 2,600 m^3 (3,400 yd^3).

During the time-critical removal action in 1994, one 4 × 4 × 7-ft wooden wastebox containing loose ACM roofing and personal protective equipment (PPE) was removed from the site. Another 57.3 m^3 (75 yd^3) of ACM roofing was unearthed to gain access to calcine waste or to investigate the extent of ACM disposal at the site. This material was subsequently reburied in the southeastern portion of the pond.

Geophysical characterization of the CFA-04 pond was conducted in 1995 and identified the extent of buried ACM roofing in the south portions of the pond. Several samples collected as part of the RI/FS activities showed little or no mercury contamination in the area where the ACM roofing appears to be buried. Bulk calcine was removed from the site to the extent it was identified. However, granules of loose calcine are contained throughout the site, presumably from wind-blown dispersion. The ACM roofing and commingled soil removed from the site will contain some calcine. However, incidental calcine contamination will not be significant enough to classify the ACM roofing as a hazardous waste. In the unlikely event that bulk calcine is discovered during ACM roofing removal activities, it will need to be separated from the ACM roofing or a separate hazardous waste determination will be required.

1.4.3 Radiological Sampling History

During the comprehensive RI/FS for the CFA OU 4-13, samples of the soils in the pond area were evaluated for radioactivity. The sample analysis revealed above background concentrations of some isotopes in the area of the pond near the inlet of the discharge pipe from CFA-674. In the area of the pond where there appears to be buried material, soil samples were normal background or lower for concentrations of the tracer isotopes. Roofing materials may not have been sampled for radioactivity, but it is not expected that the material from either of the two probable sources would have been radioactively contaminated.

1.5 Scope of Work

The selected remedy for the CFA-04 pond is defined in the *Final Comprehensive Record of Decision for Central Facilities Area Operable Unit 4-13* (DOE-ID 2000) as excavation, treatment by stabilization, and on-INEEL disposal for the mercury-contaminated soils. Prior to excavating the soils, additional samples must be taken to further define the extent of contamination. These data will help determine the specific soil areas to be excavated during the remedial action. The buried asbestos roofing materials will also be excavated and removed from the CFA-04 site. It is anticipated that the excavated soils and asbestos roofing materials will be disposed of at an approved INEEL disposal facility.

1.5.1 Pre-Remedial Sampling

The scope for the pre-remedial sampling is covered in the *Field Sampling Plan for the Pre-Remediation Sampling of the Central Facilities Area-04 Pond* (DOE-ID 2002). Soil samples will be obtained using subcontract personnel operating a drill rig with a hollow-stem auger. Samples will be collected following the procedures delineated in Technical Procedure (TPR) -6559, "Sampling with a Hollow-Stem Auger," as well as the requirements set forth in the subcontractor's scope of work and specifications.

Much of the area to be sampled is covered with a 15- to 30-cm (6- to 12-in.) layer of gravel. Prior to sampling at a given location, the gravel layer will need to be removed by hand digging before using the drill auger. The gravel layer will not require sampling since it was emplaced in 2001 as a fire mitigation method and was not contaminated in the same manner as the pond sediments.

1.5.2 Excavation of Contaminated Soils

The results from the pre-remediation sampling will help determine the extent of soil excavation required at the CFA-04 site. Detailed information concerning the location and amounts of soils to be excavated will be found in the CFA-04 Remedial Design/Remedial Action Work Plan. The mercury in the soil is primarily from laboratory calcine waste and wind-blown contamination and the soil is assumed to not contain bulk calcine areas.

Heavy equipment will be employed in excavating the soils at the CFA-04 site. Soils will be loaded into burrito bags inside roll-off containers or dump trucks. The bags will be sealed and the containers hauled to the ICDF for storage and/or disposal.

1.5.3 Excavation of Asbestos-Containing Roofing Materials

The buried roofing materials will also be excavated and removed from the CFA-04 site. This activity will be performed independently from the mercury-contaminated soils excavation and removal. The roofing material will be removed in two separate phases. Phase I will cover the removal of any roofing materials located on the surface of the pond. This material will be handled and disposed of as friable asbestos and will be collected and bagged by hand. Phase II will cover the excavation and removal of all buried roofing materials using heavy equipment. The roofing material removed in Phase II will be handled and disposed of as non-friable asbestos material. The two phases are based on previous inspection information related to the friability of the asbestos-containing roofing materials. The materials on the surface of the pond appeared to be friable, as a result of being exposed to the elements and weathering in the pond bottom. For the purposes of this removal action, any roofing materials found on the surface of the pond will be assumed to be friable. However, the roofing materials that have remained below the soil surface have remained intact and are determined to be non-friable.

1.5.4 Other Activities

Besides excavation and removal of contaminated soils and buried roofing materials, general site cleanup will occur. Miscellaneous construction debris is located throughout the CFA-04 site. This debris will be removed as part of the remediation of the site. Also, soil may be moved around the site to fill in low areas and to generally smooth out the surface of the pond. The outside fence around the pond will be disassembled and removed. Once cleanup activities are complete, the area will then be revegetated with native groundcover to match the site's surroundings.

2. HAZARD IDENTIFICATION AND MITIGATION

The overall objective of this section is to identify existing and anticipated hazards based on the CFA-04 pre-remedial sampling and remedial action scope of work and to provide controls to eliminate or mitigate these hazards. These include the following:

- Evaluation of each project task to determine the safety hazards and radiological, chemical, and biological exposure potential to project personnel by all routes of entry.

- Establishment of the necessary monitoring and sampling required to evaluate exposure and contamination levels, determine action levels to prevent exposures, and provide specific actions to be followed if action levels are reached.

- Determination of necessary engineering controls, isolation methods, administrative controls, work practices, and (where these measures will not adequately control hazards) PPE to further protect project personnel from hazards.

The purpose of this hazard identification section is to lead the user to an understanding of the occupational safety and health hazards associated with project tasks. This will enable project management and safety and health professionals to make effective and efficient decisions related to the equipment, processes, procedures, and the allocation of resources to protect the safety and health of project personnel.

The magnitude of danger presented by these hazards to personnel entering work zones is dependent on both the nature of tasks being performed and the proximity of personnel to the hazards. Engineering controls will be implemented (whenever possible) along with administrative controls, work practices, and PPE to further mitigate potential exposures and hazards. This section describes the chemical, radiological, safety, and environmental hazards that personnel may encounter while conducting project tasks. Hazard mitigation provided in this section in combination with other work controls (e.g., technical procedures, work orders, job safety analyses, and Guide [GDE] –6212, "Hazard Mitigation Guide for Integrated Work Control Process") will also be used, where applicable, to eliminate or mitigate project hazards.

2.1 Chemical and Radiological Hazards and Mitigation

Personnel may be exposed to chemical and radiological hazards while working at the CFA-04 remediation site. Preliminary risk screening following the 1994 and 1995 soil investigations indicated that the following constituents detected in the soils at the pond site posed potential health risks: aroclor-1254, arsenic, mercury, Cs-137, U-234, U-235, and U-238. Additional characterization samples were taken during 1997 and 1998. Data from these investigations confirmed the presence of mercury at concentrations up to 439 mg/kg. In accordance with the Record of Decision, the only contaminant that poses an unacceptable risk to human health and the environment is mercury. In addition, personnel may be exposed to airborne asbestos fibers during the excavation of buried roofing materials. Table 2-1 shows the range of concentrations detected for the contaminants of concern. Table 2-2 lists health-based evaluation information for each contaminant of concern.

Although naturally occurring and man-made radionuclides have been detected above INEEL background values, the CFA-04 site is not a radiological controlled area; it is neither a radiological material area, nor a soil contamination area. Radiological exposures to site personnel are not expected. However, Radiological Control (RadCon) personnel will review all planned work activities, and any necessary radiological safeguards and controls (i.e., exit surveys, air monitoring, personnel dosimetry) will be implemented.

Table 2-1. Worker health-based chemical and radiological contaminants of concern.

Chemical or Compound	Range of Detection		Matrix or Source
	Low	High	
Arsenic	3.1 mg/kg	22.4 mg/kg	Soil
Mercury	0.12 mg/kg	439 mg/kg	Soil
Cs-137	0.0742 pCi/g	2 pCi/g	Soil
U-234	0.651 pCi/g	22.6 pCi/g	Soil
U-235	0.0225 pCi/g	1.6 pCi/g	Soil
U-238	0.73 pCi/g	35 pCi/g	Soil

Table 2-2. Evaluation of health-based contaminants of concern at the CFA-04 site.

Material or Chemical (CAS No.) [other information as identified]	Exposure Limit[a] (Permissible Exposure Limit and Threshold Limit Value)	Routes of Exposure	Symptoms of Overexposure (Acute and Chronic)	Target Organs and System	Carcinogen? (Source)	Matrix or Source at Project Site
Asbestos (1332-21-4; 12001-28-4; 12172-73-5; 77536-66-4; 77536-67-5; 77536-68-6; 132207-32-0)	TLV = 0.1 fiber/cc PEL = 0.1 fiber/cc (29 CFR 1926.1101)	Inhalation, ingestion, and contact hazard	Irritation of eyes and skin, chronic asbestosis, restricted pulmonary function	Eyes and respiratory tract	A1-ACGIH Yes-NTP Yes-IARC Yes-OSHA	Buried ACM roofing material located at southern perimeter of pond. Some roofing materials located on pond surface. Moderate to high exposure potential
Mercury compounds (7439-97-6) [Vapor Pressure: 0.0012 mm Hg]	TLV-TWA = 0.025 mg/m^3 (as inorganic Hg); 0.01 mg/m^3 (as alkyl compound)	Inhalation ingestion, skin absorption, and contact hazard	Inhalation of vapors may cause pneumonitis. Extremely destructive to mucus membrane, upper respiratory tract, eyes, and skin. Burning sensation, coughing, wheezing, laryngitis, short breath, headache, nausea, vomiting, tremors, insomnia.	Central nervous system, vision, kidney, skin, respiratory system	No	Mercury-containing calcine in the soil Low exposure potential

Table 2-2. (continued).

Material or Chemical (CAS No.) [other information as identified]	Exposure Limit[a] (Permissible Exposure Limit and Threshold Limit Value)	Routes of Exposure	Symptoms of Overexposure (Acute and Chronic)	Target Organs and System	Carcinogen? (Source)	Matrix or Source at Project Site
Radionuclides						
Radionuclides (whole-body exposure)	As per *INEEL Radiation Control Manual*	Whole body	Acute – gastrointestinal disorders, bacterial infections, hemorrhaging, anemia, loss of body fluids, cataracts, temporary sterility Chronic cancer, pre-cancerous lesions, benign tumors, cataracts, skin changes, congenital defects	Blood-forming cells, gastrointestinal tract, and rapidly dividing cells	Yes	Low levels detected in soil samples Low exposure potential

a. Sources: *Threshold Limit Values Booklet* (ACGIH 2002) and substance-specific standards (29 CFR 1910).

TLV = threshold limit value

PEL = permissible exposure limit

ACGIH = American Conference of Government Industrial Hygienists

NTP – National Toxicology Program

IARC = International Agency for Research on Cancer

TWA = time-weighted average

RWP = radiological work permit

2.1.1 Routes of Exposure

Exposure pathways exist for the contaminants of concern at the project site. Engineering controls, monitoring, training, and work controls will mitigate potential contact and uptake of these hazards; however, the potential for exposure to contaminants still exists.

Chemical and radiological hazards will be eliminated, isolated, or mitigated to the extent possible during all project tasks. Where they cannot be eliminated or isolated, monitoring for chemical and radiological hazards will be conducted (as described in Section 3) to detect and quantify exposures. In addition, administrative controls, training, work procedures, and protective equipment will be used to further reduce the likelihood of exposure to these hazards.

Job safety analyses (JSAs) and radiological work permits (RWPs) may be used in conjunction with this HASP to address specific hazardous operations (e.g., hot work) and radiological conditions at the project site. If used, these documents will further detail specialized PPE and dosimetry requirements.

2.1.2 Specific Project Controls

The primary control on the site will be wetting and misting methods to keep dust and contaminants from becoming airborne. When excavating the buried roofing shingles, it may be necessary to saturate the soil thoroughly up to 2 days prior to work. This will help ensure dust control throughout the full depth of the excavation. It is anticipated that additional surface spraying will be required during the removal to control any visible dust emissions. Personal protective equipment may also be worn as required by task-specific JSAs and Section 5 of this HASP.

During sampling activities, no detectable personnel exposures to mercury are expected. To support this assumption, real-time monitoring will be performed per Section 3 of this HASP. However, several samples will be taken by coring down into areas containing roofing materials. Surface misting of the cuttings being pulled up by the auger will serve as the primary control. Personal protective equipment will also be worn as required by the task-specific JSA and Section 5 of this HASP.

2.2 Safety and Physical Hazards and Mitigation

Industrial safety and physical hazards will be encountered while performing work at the CFA-04 site. Section 4.2 provides general safe-work practices that must be followed at all times. The following sections describe specific industrial safety hazards and procedures to be followed, as applicable, to eliminate or minimize potential hazards to project personnel.

2.2.1 Material Handling and Back Strain

Material handling and maneuvering of various pieces of equipment may result in employee injury. All lifting and material-handling tasks will be performed in accordance with Management Control Procedure (MCP) -2692, "Preventing Ergonomic and Back Disorders." Personnel will not physically lift objects weighing more than 22 kg (50 lb) or one-third of their body weight (whichever is less) alone. In addition, back strain and ergonomic considerations must be given to material handling and equipment usage. Mechanical and hydraulic lifting devices should be used to move materials whenever possible. The industrial hygienist will conduct ergonomic evaluations of various project tasks to determine the potential ergonomic hazards and provide recommendations to mitigate these hazards. Applicable requirements from Program Requirements Document (PRD) -2016 or MCP-2739, "Material Handling, Storage, and Disposal," will also be followed.

2.2.2 Working and Walking Surfaces

Slippery or uneven work surfaces can increase the likelihood of back injuries, overexertion injuries, slips, and falls. The CFA-04 pond site presents inherent tripping hazards because of the uneven terrain, presence of rocks and debris, and the equipment used during the sampling and remediation work. During the prejob briefing, all personnel will be made aware of tripping hazards that cannot be eliminated. Tripping and slip hazards will be evaluated during the course of the project in accordance with PRD-2005 or PRD-5103, "Walking and Working Surfaces."

2.2.3 Elevated Work Areas

Personnel may sometimes be required to work on elevated equipment or at heights above 1.8 m (6 ft). During such work, employees will comply with requirements from PRD-2002 or PRD-5096, "Fall Protection," and applicable requirements from PRD-2006 or MCP-2709, "Aerial Lifts and Elevating Work Platforms"; PRD-2003, "Ladders"; PRD-2004 or PRD-5098, "Scaffolding"; and PRD-2005 or PRD-5103. Where required, a fall protection plan will be written.

2.2.4 Powered Equipment and Tools

Powered equipment and tools present potential physical hazards (e.g., pinch points, electrical hazards, flying debris, struck-by, and caught-between) to personnel operating them. All portable equipment and tools will be properly maintained and used by qualified individuals and in accordance with the manufacturer's specifications. At no time will safety guards be removed. Requirements from PRD-2015, "Hand and Portable Power Tools," or PRD-5101, "Portable Equipment and Handheld Power Tools," will be followed for all work performed with powered equipment including hand tools. All tools will be inspected by the user before use.

2.2.5 Electrical Hazards and Energized Systems

Electrical equipment and tools, as well as overhead and underground lines associated with CFA-04 sampling or remediation activities, may pose shock or electrocution hazards to personnel. Safety-related work practices will be employed to prevent electric shock or other injuries resulting from direct or indirect electrical contact. If work on energized systems is necessary, these practices will conform to the requirements in PRD-2011 or PRD-5099, "Electrical Safety"; MCP-3650, "Chapter IX Level I Lockout and Tagouts"; MCP-3651, "Chapter IX Level II Lockouts and Tagouts"; and Parts I through III of the National Fire Protection Association (NFPA) 70E. In addition, all electrical work will be reviewed and completed under the appropriate work controls (e.g., TPRs and work orders). When working around overhead lines, clearances will be maintained at all times. Additionally, all underground utilities and installations will be identified before conducting excavation activities in accordance with PRD-2014, "Excavation and Surface Penetrations."

2.2.6 Fire and Flammable Materials Hazards

Fuel will be required for equipment use during sampling and excavation operations. Flammable hazards are present during refueling activities and with the transfer and storage of flammable or combustible liquids. Portable fire extinguishers with a minimum rating of 10A/60BC will be strategically located at the project site to combat Class ABC fires. They will be located in all active areas, on or near all facility equipment that has exhaust heat sources, and on or near all equipment capable of generating ignition or having the potential to spark. Guidance from MCP-2707, "Compatible Chemical Storage," will be consulted when storing chemicals.

2.2.7 Combustible Materials

Combustible or ignitable materials in contact with or near exhaust manifolds, catalytic converters, or other ignition sources could result in a fire. A fire protection engineer should be contacted if questions arise about potential ignition sources. The accumulation of combustible materials will be strictly controlled. Disposal of combustible materials will be assessed at the end of each shift. Class A combustibles such as trash, cardboard, rags, wood, and plastic will be properly disposed of in appropriate waste containers. The fire protection engineer may also conduct periodic site inspections to ensure that all fire protection requirements are being met.

2.2.8 Flammable and Combustible Liquids

Fuel used at the site for fueling must be safely stored, handled, and used. Only flammable liquid containers approved by the Factory Mutual and Underwriters Laboratories and labeled with the contents will be used to store fuel. All fuel containers will be stored at least 15 m (50 ft) from any facilities and ignition sources or they will be stored inside an approved flammable storage cabinet. Additional requirements are provided in PRD-2201 or MCP-584, "Flammable and Combustible Liquid Storage and Handling." Portable motorized equipment (e.g., generators and light plants) will be shut off and allowed to cool down in accordance with the manufacturer's operating instructions before being refueled to minimize the potential for a fuel fire.

2.2.9 Welding, Cutting, or Grinding

Personnel conducting welding, cutting, or grinding tasks may be exposed to molten metal, slag, and flying debris. In addition, a fire potential exists if combustible materials are not cleared from the work area. Requirements from PRD-2010 or -5110, "Welding, Cutting, and Other Hot Work," will be followed whenever these types of activities are conducted.

2.2.10 Pressurized Systems

A variety of heavy equipment vehicles will be operated at the project site. The hazards presented to personnel, equipment, facilities, or the environment because of inadequately designed or improperly operated pressure (or vacuum) systems include blast effects, shrapnel, fluid jets, release of toxic or asphyxiant materials, contamination, equipment damage, personnel injury, and death. These systems can include pneumatic, hydraulic, vacuum, or compressed gas systems.

All pressure systems will be operated in the designed operating pressure range, which is typically 10 to 20% less than the maximum allowable working pressure. In addition, all hoses, fittings, lines, gauges, and system components will be rated for the system for at least the maximum allowable working pressure (generally the relief set point). The project safety professional should be consulted about any questions of pressure systems in use at the project site.

2.2.11 Compressed Gases

All cylinders will be used, stored, handled, and labeled in accordance with PRD-2009, "Compressed Gases." The safety professional should be consulted about any compressed gas cylinder storage, transport, and usage issues.

2.2.12 Heavy Equipment and Moving Machinery

Hazards associated with the operation of heavy equipment include injury to personnel (e.g., struck-by and caught-between hazards) and equipment and property damage. All heavy equipment will be operated in the manner in which it was intended and in accordance with manufacturer's instructions. Only authorized qualified personnel will be allowed to operate equipment; personnel near operating heavy equipment must maintain visual communication with the operator. Personnel will comply with PRD-2020 or MCP-2745, "Heavy Industrial Vehicles"; and PRD-2019 or MCP-2743, "Motor Vehicle Safety."

Personnel working around or near cranes or boom trucks will also comply with PRD-160, "Hoisting and Rigging," as applicable and appropriate.

Additional safe practices will include the following:

- All heavy equipment will have backup alarms.
- Walking directly behind or to the side of heavy equipment without the operator's knowledge is prohibited. All precautions will be taken before moving heavy equipment.
- While operating heavy equipment in the work area, the equipment operator will maintain communication with a designated person who will be responsible for providing direct voice contact or approved standard hand signals. In addition, all facility personnel in the immediate work area will be made aware of the equipment operations.
- All equipment will be kept out of traffic lanes and access ways and will be stored so as not to endanger personnel at any time.
- All unattended equipment will have appropriate reflectors or be barricaded if left on roadways.
- All parked equipment will have the parking brake set and chocks will be used when equipment is parked on inclines.
- The swing radius of heavy equipment will be adequately barricaded or marked to prevent personnel from entering into the swing radius.

2.2.13 Excavation, Surface Penetrations, and Outages

Excavation activities will be conducted in conjunction with CFA-04 remediation activities. All surface penetrations and related outages will be coordinated through the field team leader or subcontract technical representative and will require submittal of an outage request (i.e., Form 433.01, "Outage Request") for outages (e.g., road, electrical, and water). The submission of an outage request will not be considered an approval to start the work. Other specific outage requirements are addressed in the special conditions section of the management and operating contract. No surface penetrations will be allowed or conducted until the area has been evaluated and an approved subsurface evaluation documented.

All excavation activities will be conducted and monitored in accordance with PRD-2014 or PRD-22, "Excavation and Surface Penetrations," and 29 CFR 1926, Subpart P, "Excavations." The following are some key elements from these requirements:

- The location of utility installations (e.g., sewer, telephone, fuel, electric, water lines, or any other underground installations) that may reasonably be expected to be encountered during excavation work will be determined before opening an excavation.

- Structural ramps that are used solely by employees as a means of access or egress from excavations will be designed by a competent person. Structural ramps used for access or egress of equipment will be designed by a competent person qualified in structural design and will be constructed in accordance with the design. Structural ramps will be inspected in accordance with Form 432.57, "Excavation Checklist."

- Employees exposed to public vehicular traffic will be provided with and will wear warning vests or other suitable garments marked with or made of reflective or high-visibility material.

- Daily inspections of excavations, areas adjacent to the excavations, and protective systems will be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection will be conducted by the competent person before the start of work and as needed throughout the shift. Inspections will also be made after every rainstorm or other hazard-increasing occurrence.

- Sloping or benching will be constructed and maintained in accordance with the requirements set forth in PRD-2014 or PRD-22 for the soil type as classified by the competent person. This classification of the soil deposits will be made based on the results of at least one visual inspection and at least one manual analysis.

2.2.14 Hoisting and Rigging of Equipment

As applicable for project operations, all hoisting and rigging will be performed in accordance with PRD-2007 or PRD-160, "Hoisting and Rigging," and DOE-STD-1090-01, "Hoisting and Rigging." Hoisting and rigging equipment will show evidence of a current inspection (e.g., tag) and be inspected before use by qualified personnel. The operator or designated person for mobile cranes or boom trucks will also perform a visual inspection each day or before use (if the crane has not been in regular service) of items such as, but not limited to, the following:

- All control mechanisms for maladjustment that would interfere with proper operation

- Crane hooks and latches for deformation, cracks, and wear

- Hydraulic systems for proper oil level

- Lines, tanks, valves, pumps, and other parts of air or hydraulic systems for leakage

- Hoist ropes for kinking, crushing, birdcaging, and corrosion

- All anti-two-block, two-block warning, and two-block damage prevention systems for proper operation.

NOTE: *The operator or other designated person will examine deficiencies and determine whether they constitute a safety hazard. If deficiencies are found, they will be reported to the safety professional.*

2.2.15 Drilling Hazards

A wireline core rig with a rotating auger will be used at the project site to draw core samples from the designated sample locations. Some anticipated hazards include hoisting material with catlines, slippery or cluttered work surfaces, and working around a rotating auger.

Catlines are used on drilling rigs to hoist material. Accidents that occur during catline operations may injure the worker doing the rigging as well as the operator. Minimal control over hoisting materials can cause sudden and erratic load movements, which may result in hand and foot injuries.

Working surfaces around drill rigs can often become cluttered with tools, equipment, and cuttings. Such work surfaces can increase the likelihood of slips, trips, and falls. Good housekeeping and a general awareness of work surroundings will help minimize these risks.

The sampling rig operates with a rotating auger. The nature of the work requires workers to be near the auger while it is rotating. Serious injury could occur if equipment or a worker's clothing is caught in the rotating auger. Workers must take special care and remain alert while working near the auger.

2.2.16 Material Handling

The most common type of accident that occurs during material handling is when a load is being handled and a finger or toe is caught between two objects. Rolling stock can shift or fall from a pipe rack or truck bed. Fingers and hands can be caught between sampling barrels, breakout vices, and tools.

2.2.17 Personal Protective Equipment

Wearing PPE will reduce a worker's ability to move freely, see clearly, and hear directions and noise that might indicate a hazard. In addition, PPE can increase the risk of heat stress. Work activities at the task site will be modified as necessary to ensure that personnel are able to work safely in the required PPE. Work-site personnel will comply with PRD-2001 or PRD-5121, "Personal Protective Equipment," and MCP-432, "Radiological Personal Protective Equipment." All personnel who wear PPE will be trained in its use and limitations in accordance with PRD-2001 or PRD-5121.

2.2.18 Decontamination

Decontamination procedures for personnel and equipment are detailed in Section 11. Potential hazards to personnel conducting decontamination tasks include back strain; slip, trip, and fall hazards; and cross-contamination from contaminated surfaces. In addition, electrical hazards may be present if powered equipment (e.g., a powered pressure washer) is used. Mitigation of these walking surface hazards and electrical hazards is addressed in prior subsections. If a power washer or heated power washer is used, units will be operated in accordance with the manufacturer's operating instructions, personnel will wear appropriate PPE to prevent high-pressure spray injuries, personnel will use ground-fault circuit protection, and these tasks will only be conducted in approved areas. Personnel will wear required PPE at all times during decontamination tasks, as listed in Section 5.

2.3 Environmental Hazards and Mitigation

Potential environmental hazards could endanger personnel during project tasks. These hazards will be identified and mitigated to the extent possible. The following subsections describe these environmental hazards and state the procedures and work practices that will be followed to mitigate them.

2.3.1 Noise

Personnel involved in project activities may be exposed to noise levels that exceed 85 decibel A-weighted (dBA) for an 8-hour time-weighted average (TWA) or 83 dBA for a 10-hour TWA. The effects of high sound levels (noise) may include the following:

- Personnel being startled, distracted, or fatigued
- Physical damage to the ear and pain and temporary or permanent hearing loss
- Interference with communication that would warn of danger.

Where noise levels are suspected of exceeding 80 dBA, noise measurements will be performed in accordance with PRD-2108, "Hearing Conservation," or MCP-2719, "Controlling and Monitoring Exposures to Noise," to determine if personnel are routinely exposed to noise levels in excess of the applicable TWA (85 dBA for 8 hours of exposure or 83 dBA for 10-hour exposures).

Personnel whose noise exposure routinely meets or exceeds the allowable TWA will be enrolled in the INEEL Occupational Medical Program (OMP) (or subcontractor hearing conservation program, as applicable). Personnel working on jobs that have noise exposures greater than 85 dBA (83 dBA for a 10-hour TWA) will be required to wear hearing protection until noise levels have been evaluated and will continue to wear the hearing protection specified by the industrial hygienist until directed otherwise. Hearing protection devices will be selected and worn in accordance with PRD-2108 or MCP-2719.

2.3.2 Temperature and Ultraviolet Light Hazards

Project tasks will be conducted during times when there is a potential for heat stress that could present a hazard to personnel. The industrial hygienist and HSO will be responsible for obtaining meteorological information to determine if additional heat stress administrative controls are required. All project personnel must understand the hazards associated with heat stress and take preventive measures to minimize the effects. "Heat and Cold Stress" (PRD-2107 or MCP-2704) guidelines will be followed when determining work-rest schedules or when halting work activities because of temperature extremes.

2.3.2.1 Heat Stress. High ambient air temperatures can result in increased body temperature, heat fatigue, heat exhaustion, or heat stroke that can lead to symptoms ranging from physical discomfort, unconsciousness, to death. In addition, tasks requiring the use of protective equipment or respiratory protection prevent the body from cooling. Personnel must inform the field team leader (FTL) or HSO when experiencing any signs or symptoms of heat stress or observing a fellow employee (i.e., buddy) experiencing them. Heat stress stay times will be documented on the appropriate work control document(s), (i.e., a JSA, Prejob Briefing Form, or other) by the HSO in conjunction with the industrial hygienist (as required) when personnel wear PPE that may increase heat body burden. These stay times will take into account the amount of time spent on a task, the nature of the work (i.e., light, moderate, or heavy), type of PPE worn, and ambient work temperatures. Table 2-3 lists heat stress signs and symptoms of exposure.

Table 2-3. Heat stress signs and symptoms of exposure.

Heat-Related Illness	Signs and Symptoms	Emergency Care
Heat rash	Red skin rash and reduced sweating.	Keep the skin clean, change all clothing daily, and cover affected areas with powder containing cornstarch or with plain cornstarch.
Heat cramps	Severe muscle cramps and exhaustion, sometimes with dizziness or periods of faintness.	Move the patient to a nearby cool place; give the patient half-strength electrolytic fluids; if cramps persist, or if signs that are more serious develop, seek medical attention.
Heat exhaustion	Rapid, shallow breathing; weak pulse; **cold, clammy skin; heavy perspiration;** total body weakness; dizziness that sometimes leads to unconsciousness.	Move the patient to a nearby cool place, keep the patient at rest, give the patient half-strength electrolytic fluids, treat for shock, and seek medical attention. DO NOT TRY TO ADMINISTER FLUIDS TO AN UNCONSCIOUS PATIENT.
Heat stroke	Deep, then shallow, breathing; rapid, strong pulse, then rapid, weak pulse; **dry, hot skin**; dilated pupils; loss of consciousness (possible coma); seizures or muscular twitching.	Cool the patient rapidly. Treat for shock. If cold packs or ice bags are available, wrap them and place one bag or pack under each armpit, behind each knee, one in the groin, one on each wrist and ankle, and one on each side of the neck. Seek medical attention as rapidly as possible. Monitor the patient's vital signs constantly. DO NOT ADMINISTER FLUIDS OF ANY KIND.

NOTE: *Heat exhaustion and heat stroke are extremely serious conditions that can result in death and should be treated as such. The FTL or designee should immediately request an ambulance (777 or 526-1515) be dispatched from the CFA-1612 medical facility and the individual cooled, as described above in Table 2-3, based on the nature of the heat stress illness.*

2.3.2.2 Ultraviolet Light Exposure. Personnel will be exposed to ultraviolet light (UV) (i.e., sunlight) when conducting project tasks. Sunlight is the main source of UV known to damage the skin and to cause skin cancer. The amount of UV exposure depends on the strength of the light, the length of exposure, and whether the skin is protected. No UV rays or suntans are safe. The following are mitigative actions to take to minimize UV exposure:

- Wear clothing to cover the skin (long pants [no shorts] and long-sleeve or short-sleeve shirt [no tank tops])
- Use a sunscreen with a sun protection factor of at least 15
- Wear a hat (hard hat, where required)
- Wear UV-absorbing safety glasses
- Limit exposure during peak intensity hours of 10 a.m. to 4 p.m., whenever possible.

2.3.3 Inclement Weather Conditions

When inclement or adverse weather conditions develop that may pose a threat to persons or property at the project site (e.g., sustained strong winds 25 mph or greater, electrical storms, heavy precipitation, or extreme heat or cold), conditions will be evaluated and a decision made by the HSO with input from other personnel to halt work, employ compensatory measures, or proceed. The FTL and HSO will comply with INEEL MCPs and facility work control documents that specify limits for inclement weather.

2.3.4 Subsidence

Personnel may be exposed to subsidence hazards from buried waste pits and trenches or uncompacted backfilled excavation areas during project activities. This is primarily an equipment hazard when driving or operating equipment in subsidence areas; however, personnel may also be at risk from walking in these areas.

2.3.5 Biological Hazards

The INEEL is located in an area that provides habitat for various rodents, insects, and vectors (i.e., organisms that carry disease-causing microorganisms from one host to another). The potential exists for encountering nesting materials or other biological hazards and vectors. The Hantavirus may be present in the nesting and fecal matter of deer mice. If such materials are disturbed, they can become airborne and create a potential inhalation pathway for the virus. Contact and improper removal of these materials may provide additional inhalation exposure risks.

If suspected rodent nesting or excrement material is encountered, the industrial hygienist will be notified immediately and **no attempt will be made to remove or clean the area**. Following an evaluation of the area, disinfection and removal of such material will be conducted in accordance with MCP-2750, "Preventing Hantavirus Infection."

Snakes, insects, and arachnids (e.g., spiders, ticks, and mosquitoes) may also be encountered. Common areas to avoid include material stacking and staging areas, under existing structures (e.g., trailers and buildings), under boxes, and other areas that provide shelter. Protective clothing will generally prevent insects from direct contact with the skin. If potentially dangerous snakes or spiders are found or are suspected of being present, warn others, keep clear, and contact the industrial hygienist or HSO for additional guidance (as required).

Insect repellant (DEET or equivalent) may be required. Areas where standing water has accumulated (e.g., evaporation ponds) provide breeding grounds for mosquitoes and should be avoided. In cases where a large area of standing water is encountered, it may be necessary to pump the water out of the declivity (areas other than the evaporation ponds).

2.3.6 Confined Spaces

There are no identified confined spaces at the project site. Contact the industrial hygienist if there is any question as to whether a space may meet the definition of a confined space. If entry into a confined space is required, then all requirements of MCP-2749, "Confined Spaces," will be followed.

2.4 Other Task-Site Hazards

Task-site personnel should continually look for potential hazards and immediately inform the FTL or HSO of the hazards so that action can be taken to correct the condition. All personnel have the authority to initiate STOP WORK actions in accordance with PRD-1004 or MCP-553, "Stop Work Authority," if it is perceived that an imminent safety or health hazard exists or take corrective actions within the scope of the work control authorization documents to correct minor safety or health hazards and then inform the FTL.

Personnel working at the task site must use safe-work practices, report unsafe working conditions or acts, and exercise good housekeeping habits with respect to tools, equipment, and waste throughout the course of the project.

2.5 Site Inspections

Project personnel may participate in site inspections during the work control preparation stage (such as the hazard identification and verification walkdowns) and may conduct self-assessments or other inspections. In addition, periodic safety inspections will be performed by the HSO, project manager, or FTL in accordance with MCP-3449, "Safety and Health Inspections."

Targeted or required self-assessments may be performed during investigation and sampling operations in accordance with MCP-8, "Self-Assessment Process for Continuous Improvement." All inspections and assessments will be documented and available for review by the FTL. These inspections will be noted in the FTL logbook. Health and safety professionals present at the task site may, at any time, recommend changes in work habits to the FTL. However, all changes that may affect the work control documents must have concurrence from the appropriate project technical representatives and a data analysis report prepared (when required).

3. EXPOSURE MONITORING AND SAMPLING

A potential for exposure to radiological, chemical, or physical hazards exists during project tasks. Refinement of work control zones (see Section 7), use of engineering and administrative controls, worker training, and wearing PPE provide the mitigation strategy for these hazards. Monitoring and sampling will be used during project tasks to (1) assess the effectiveness of these controls, (2) determine the type of PPE needed for individual tasks, and (3) determine the need for upgrading and downgrading PPE, as described in Section 5. Monitoring will be conducted in and around the active work location(s) on a periodic basis and as determined based on site-specific conditions.

Table 3-1 lists the hazards to be monitored and the monitoring instruments that may be used. Table 3-2 lists the action levels and associated responses for specific hazards.

3.1 Exposure Limits

Exposure limits identified in Table 3-2 serve as the initial action limits for specific project tasks. Project tasks will be continually assessed in accordance with PRD-25, "Activity Level Hazard Identification, Analysis, and Control," and evaluated by RadCon and Industrial Hygiene personnel to ensure engineering control effectiveness. Action limits should be adjusted as required based on changing site conditions, exposure mitigation practices, and PPE levels.

3.2 Environmental and Personnel Monitoring

Industrial Hygiene and RadCon personnel will conduct periodic monitoring with direct-reading instrumentation, collect swipes, and conduct full- and partial-period air sampling (as deemed appropriate) in accordance with the applicable MCPs, OSHA substance-specific standards, and INEEL manuals. Instrumentation listed on Table 5-1 will be selected based on the site-specific conditions and contaminants associated with project tasks. The radiological control technician (RCT) and industrial hygienist will be responsible for determining the best monitoring technique for radiological and non-radiological contaminants (respectively). Safety hazards and other physical hazards will be monitored and mitigated, as outlined in Section 2.

3.2.1 Industrial Hygiene Area and Personal Monitoring and Instrument Calibration

The project industrial hygienist will conduct full- and partial-period sampling of airborne contaminants and monitoring of physical agents at a frequency deemed appropriate based on direct-reading instrument readings and changing site conditions. When conducted, all air sampling will be conducted using applicable National Institute of Occupational Safety and Health (NIOSH), OSHA, or other validated method. Both personal and area sampling and monitoring may be conducted.

Various direct-reading instruments may be used to determine the presence of nonradiological and other physical agents. The frequency and type of sampling and monitoring will be determined by changing site conditions, direct-reading instrument results, observation, professional judgment, and in accordance with MCP-153, "Industrial Hygiene Exposure Assessment."

All monitoring instruments will be maintained and calibrated in accordance with the manufacturer's recommendations, existing Industrial Hygiene protocol, and in conformance with the companywide safety and health manuals, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection* and *Manual 14B—Safety and Health—Occupational Health.* Direct-reading instruments will be calibrated, at a minimum, before daily use and more frequently as determined by the project

industrial hygienist. Calibration information, sampling and monitoring data, results from direct-reading instruments, and field observations will be recorded as stated in Section 12.

3.2.2 Area Radiological Monitoring and Instrument Calibration

Area radiological monitoring may be conducted during project tasks to ensure that personnel are given adequate protection from potential radiological exposure. Instruments and sampling methods listed in Table 3-1 may be used by the RCT, as deemed appropriate and as required by project or task-specific RWPs. When conducted, monitoring will be performed in accordance with *Manual 15B—Radiation Protection Procedures* and *Manual 15C—Radiological Control Procedures.* The data obtained from monitoring will be used by RadCon personnel to evaluate the effectiveness of engineering controls, decontamination methods and procedures, and alert personnel to potential radiation sources.

Radiological Control personnel may use radiation and contamination detectors and counters listed in Table 3-1 or equivalent instruments to provide radiological information to personnel. Daily operational and source checks will be performed on all portable survey instruments to ensure that they are within the specified baseline calibration limits. Accountable radioactive sources will be maintained in accordance with MCP-137, "Radioactive Source Accountability and Control." All radiological survey and monitoring equipment will be maintained and calibrated in accordance with the manufacturer's recommendations, existing RadCon protocol, and in conformance with MCP-93, "Health Physics Instrumentation."

3.2.3 Personnel Radiological Exposure Monitoring

Personal radiological monitoring will be conducted to quantify radiation exposure and potential for uptakes as stated in the project or task-specific RWP. This may include the use of external dosimetry, surface monitoring, and internal dosimetry methods to ensure that engineering controls, administrative controls, and work practices are effectively mitigating radiological hazards.

3.2.3.1 External Dosimetry. Dosimetry requirements will be based on the radiation exposure potential during project tasks. When dosimetry is required, all personnel who enter the project area will be required to wear personal dosimetry devices, as specified by RadCon personnel and the RWP, and in accordance with *Manual 15A—Radiation Protection INEEL Radiological Control*.

Table 3-1. Hazards to be monitored and monitoring instruments.

Hazard to be Monitored	Monitoring Instrument Description[a,b]
Hazardous noise	ANSI Type S2A sound level meter or ANSI S1.25-1991 dosimeter (A-weighted scale for time-weighed average dosimetry, C-weighted for impact dominant sound environments).
Heat stress	Heat stress—wet-bulb globe temperature, body weight, fluid intake.
Mercury vapor	• Jerome Mercury Vapor Analyzer (or equivalent) • Personal sampling pumps with appropriate media for partial and full period sampling using NIOSH or OSHA-validated methods.
Asbestos	Personal sampling pumps with appropriate media for partial and full period sampling using NIOSH or OSHA-validated methods.
Dust	• Direct-reading instrument (miniram or DustTrak) • Personal sampling pumps with appropriate media for partial and full period sampling using NIOSH or OSHA-validated methods.
Ionizing radiation	(Alpha) Count rate—Bicron/NE Electra (DP-6 or AP-5 probe) or equivalent. Stationary—Eberline RM-25 (HP-380AB or HP-380A probe) or equivalent. (Beta-gamma) Count rate—Bicron NE/Electra (DP-6, BP-17 probes) or equivalent. Stationary—Eberline RM-25 (HP-360AB probe) or equivalent.
Radionuclide contamination	CAM—ALPHA 6-A-1 (in-line and radial sample heads, pump, RS-485) or equivalent (as required). CAM (beta)—AMS-4 (in-line and radial head, pump RS-485) or equivalent (as required). Grab sampler—SAIC H-810 or equivalent.

a. Monitoring and sampling will be conducted as deemed appropriate by project Industrial Hygiene and Radiological Control personnel based on specific tasks and site conditions.
b. Equivalent instrumentation other than those listed may be used.
ANSI = American National Standards Institute
CAM = continuous air monitor

Table 3-2. Action levels and associated responses for identified hazards.

Contaminant/Agent Monitored	Action Level		Response Taken If Action Levels Are Exceeded	
Asbestos	0.1 fiber/cc		Stop Work. Reevaluate work process and controls.	
Mercury vapor	0.01 mg/m^3 sustained in breathing zone.		Move personnel to upwind position of source. Use wetting or misting methods. IF wetting or misting methods prove ineffective, THEN don respiratory protection[a] (as directed by industrial hygienist).	
Dust, nuisance particulates	>10 mg/m^3 (inhalable fraction) >3 mg/m^3 (respirable fraction)		Move personnel to upwind position of source and close equipment cab windows and doors. Use wetting or misting methods to minimize dust and particulate matter. IF wetting or misting methods prove ineffective, THEN don respiratory protection[a] (as directed by industrial hygienist).	
Hazardous noise levels	<85 dBA 8-hour TWA, <83 dBA 10-hour TWA		No action.	
	85 to 114 dBA		Hearing protection required to attenuate hazard to below 85 dBA 8-hour TWA or 83 dBA for 10-hour TWA (device NRR).	
	(a) >115 dBA	(b) >140 dBA	(a) Isolate source, evaluate NRR for single device, double protection as needed.	(b) Control entry, isolate source, only approved double protection worn.
Radiation field	<5 mrem/hour		No action, no posting required.	
	5 to 100 mrem/hour at 30 cm (10 CFR 835.603.b)		Post as "Radiation Area"—Required items: Radiological Worker I or II training, RWP, personal dosimetry.	
Radionuclide contamination	1 to 100 times Radiological Control Manual[b] Table 2-2 values (10 CFR 835.603.d)		Post as "Contamination Area"—Required items: RW II training, personal dosimetry, RWP, don PPE, bioassay submittal (as required).	
Airborne radioactivity	Concentrations (μCi/cc) >30% of and derived air concentration value (10 CFR 835.603.d)		Post as "Airborne Radioactivity Area"—Required items: RW II training, personal dosimetry, RWP (with prejob briefing), don PPE, bioassay submittal (as required).	

Table 3-2. (continued).

Contaminant/Agent Monitored	Action Level	Response Taken If Action Levels Are Exceeded

a. Level C respiratory protection will consist of a full-face respirator equipped with filter cartridge(s), as prescribed by the project Industrial Hygiene and Radiological Control personnel (based on contaminant of concern). See Section 5 for additional Level C requirements.
b. *Manual 15—Radiation Protection—INEEL Radiological Control* (PRD-183).
NRR = noise reduction rating

4. ACCIDENT AND EXPOSURE PREVENTION

Project activities will present numerous hazards to project personnel. It is critical that all personnel understand and follow the site-specific requirements of this HASP and other work control documents. Engineering controls, hazard isolation, specialized work practices, and the use of PPE will all be implemented to eliminate or mitigate all potential hazards and exposures (where feasible). However, all personnel are responsible for the identification and control of hazards in their work area in accordance with Integrated Safety Management System (ISMS) principals and practices. **At no time will hazards be left unmitigated without implementing some manner of controls (e.g., engineering controls, administrative controls, or the use of PPE).** Project personnel should use stop work authority in accordance with PRD-1004 or MCP-553, where it is perceived that imminent danger to personnel, equipment, or the environment exists.

This HASP is to be used in conjunction with PRD-25 and work authorization and control documents such as Standard (STD) –101, "Integrated Work Control Process"; work orders; JSAs; MCP-3562, "Hazard Identification, Analysis, and Control of Operational Activities;" and operational technical procedures.

4.1 Voluntary Protection Program and Integrated Safety Management

The INEEL safety processes embrace the Voluntary Protection Program (VPP) and ISMS criteria, principles, and concepts to identify and mitigate hazards, thereby preventing accidents. All management and workers are responsible for implementing safety policies and programs and for maintaining a safe and healthful work environment. Project personnel are expected to take a proactive role in preventing accidents, ensuring safe working conditions for themselves and fellow personnel, and complying with all work control documents, procedures, and permits.

The **ISMS** is focused on the **system** side of conducting operations and **VPP** concentrates on the **people** aspect of conducting work. Both programs define work scope, identify and analyze hazards, and mitigate the hazards. Additional information on these programs is available on the INEEL Intranet. Bechtel BWXT Idaho, LLC (current primary management and operating contractor) and its subcontractors participate in VPP and ISMS for the safety of their employees. This document includes all elements of both systems. The five key elements of VPP and ISMS and their corresponding HASP sections are as follows:

Voluntary Protection Program	Integrated Safety Management System	Health and Safety Plan Section
	Define work scope	Section 1
Work site analysis	Analyze hazards	Section 2, 3, 5, 8
Hazard prevention and control	Develop and implement controls	Section 2, 3, 4, 5, 7, 10, and 11
Safety and health training	Perform within work controls	Section 6
Employee involvement	Perform work within controls	Section 2, 3, and 4
Management leadership	Provide feedback and improvement	Section 6, 9

4.2 General Safe-Work Practices

Sections 1 and 2 defined the project scope of work and associated project-specific hazards and mitigation. The following practices are mandatory for all project personnel to further reduce the likelihood of accidents and injuries. All visitors permitted to enter work areas must follow these requirements. Failure to follow these practices may result in permanent removal from the project and other disciplinary actions. The project FTL and HSO will be responsible for ensuring that the following safe-work practices are adhered to at the project site:

- Limit work area access to authorized personnel only, in accordance with Section 7.
- All personnel have the authority to initiate STOP WORK actions in accordance with PRD-1004 or MCP-553.
- Personnel will not eat, drink, chew gum or tobacco, smoke, apply sunscreen, or perform any other practice that increases the probability of hand-to-mouth transfer and ingestion of materials in work areas, except within designated areas.
- Be aware of and comply with all safety signs, tags, and barriers.
- Be alert for dangerous situations, strong or irritating odors, airborne dusts or vapors, and spills that may be present. Report all potentially dangerous situations to the FTL or HSO.
- Avoid direct contact with hazardous materials and waste. Personnel will not walk through spills or other areas of contamination and will avoid kneeling, leaning, or sitting on equipment or surfaces that may be contaminated.
- Be familiar with the physical characteristics of the project site, including, but not limited to:
  - Prevailing wind direction
  - Location of fellow personnel, equipment, and vehicles
  - Communications at the project site
  - Type of hazardous materials stored and waste disposed of on the project site
  - Major roads and means of access to and from the project site
  - Location of emergency equipment
  - Warning devices and alarms for area or facility
  - Capabilities and location of nearest emergency assistance.
- Report all broken skin or open wounds to the operations manager, FTL, or HSO. An OMP physician must examine all wounds to determine the nature and extent of the injury. If required to enter into a radiological contamination area, a RadCon supervisor will determine whether the wound can be bandaged adequately in accordance with Article 542 of the *INEEL Radiological Control Manual* (Manual 15A).

- Prevent releases of hazardous materials. If a spill occurs, personnel must try to isolate the source (if possible and if this does not create a greater exposure potential) and then report it to the FTL or HSO. The Warning Communications Center (WCC) will be notified and additional actions will be taken, as described in Section 10. Appropriate spill response kits or other containment and absorbent materials will be maintained at the project site.

- Illumination levels during project tasks will be in accordance with 29 CFR 1910.120 (Table H-120.1, "Minimum Illumination Intensities in Foot-Candles").

- Ground-fault protection will be provided whenever electrical equipment is used outdoors.

- Keep all ignition sources at least 15 m (50 ft) from explosive or flammable environments and use non-sparking, explosion-proof equipment, if advised to do so by safety professionals.

- Follow all safety and radiological precautions and limitations of technical procedures and requirements identified in work packages.

4.3 Subcontractor Responsibilities

Subcontractors are responsible for meeting all applicable INEEL MCP, PRD, VPP, and ISMS flow-down requirements and contract general and special conditions. Subcontractors are also expected to take a proactive role in hazard identification and mitigation while conducting project tasks and report unmitigated hazards to the appropriate project point of contact after taking mitigative actions within the documented work controls.

4.4 Radiological and Chemical Exposure Prevention

Exposure to potential chemical, radiological, and physical hazards will be mitigated by the use of engineering controls, administrative controls, or PPE to prevent exposures where possible or minimize them where engineering controls are not feasible. All project personnel are responsible for understanding the hazard identification and mitigation measures necessary to prevent exposures.

4.4.1 Radiological Exposure Prevention—As Low as Reasonably Achievable Principles

Radiation exposure of project personnel will be controlled such that radiation exposures are well below regulatory limits and that there is no radiation exposure without commensurate benefit. **Unplanned and preventable exposures are considered unacceptable.** All project tasks will be evaluated with the goal of eliminating or minimizing exposures. All project personnel have the responsibility for following as-low-as reasonably achievable (ALARA) principles and practices and personnel working at the site must strive to keep both external and internal radiation doses ALARA.

Radiological work permits will be written, as required, for project tasks that will define hold points, required dosimetry, RCT coverage, radiological controlled areas, and radiological limiting conditions in accordance with MCP-7, "Radiological Work Permit." Radiological Control personnel will participate in the prejob briefing required by MCP-3003, "Performing Pre-Job Briefings and Post-Job Reviews," to ensure that all personnel understand the dose rate limits and limiting conditions on the RWP. All personnel will be required to read and acknowledge the RWP requirements before being allowed to sign the RWP (or scan the RWP bar code) and obtain electronic dosimetry.

Monitoring for radiation and contamination during project tasks will be conducted in accordance with the RWP; PRD-183, *Manual 15A—Radiation Protection—INEEL Radiological Controls; Manual 15B—Radiation Protection Procedures; Manual 15C—Radiological Control Procedures;* and as deemed appropriate by RadCon personnel.

4.4.2 Chemical and Physical Hazard Exposure Avoidance

Threshold-limit values (TLVs) or other occupational exposure limits have been established for numerous chemicals and physical agents (e.g., noise, heat, or cold stress) that may be encountered. These exposure limits provide guidelines in evaluating airborne, skin, and physical agent exposures. The TLVs represent levels and conditions under which it is believed that nearly all workers may be exposed day after day without adverse health effects. The TLV-TWA is a time-weighted average concentration for a conventional 8-hour workday and a 40-hour workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse health effects. Action limits (instantaneous concentrations for short time periods) have been established (Section 3) to further reduce the likelihood of exceeding TLVs.

Controls will be employed to eliminate or mitigate chemical and physical hazards wherever feasible. The hierarchy of controls in order is (1) engineering controls, (2) administrative controls, and (3) PPE. In addition to these controls, use of technical procedures and work orders, hold points, training, and monitoring of hazards will be used, as appropriate, to reduce exposure potential. Some methods of exposure avoidance include

- Wearing all required PPE, inspecting all pieces before donning, and taping all seams
- Changing PPE if it becomes damaged or shows signs of degrading
- Minimizing time in direct contact with hazardous material or waste
- Doff PPE following standard practices (i.e., rolling outer surfaces in and down) and follow doffing sequence
- Wash hands and face before eating, drinking, smoking, or engaging in other activities that may provide a pathway for contaminants.

4.5 Buddy System

The two-person or buddy system will be used during project tasks. The buddy system is most often used during project activities requiring the use of protective clothing and respiratory protection where heat stress and other hazards may impede a person's ability to self-rescue. The buddy system requires each employee to assess and monitor his or her buddy's mental and physical well being during the course of the operation. A buddy must be able to perform the following activities:

- Provide assistance if required
- Verify the integrity of PPE
- Observe his or her buddy for signs and symptoms of heat stress, cold stress, or contaminant exposure
- Notify other personnel in the area if emergency assistance is needed.

The buddy system will be administered by the subcontract technical representative, FTL, or HSO.

5. PERSONAL PROTECTIVE EQUIPMENT

This section provides guidance for the selection and use of PPE to be worn for project tasks and contingencies for upgrading and downgrading PPE. Types of PPE are generally divided into two broad categories: (1) respiratory protective equipment and (2) PPE. Both of these categories are incorporated into the standard four levels of protection (Levels A, B, C, and D).

The purpose of personal protective clothing and equipment is to shield or isolate individuals from the chemical, physical, radiological, and safety hazards that may be encountered during project tasks when engineering and other controls are not feasible or cannot provide adequate protection. It is important to realize that no one PPE ensemble can protect against all hazards under all conditions and that proper work practices and adequate training will serve to augment PPE to provide the greatest level of protection to workers.

The Environmental Restoration PPE policy requires that field workers wear, as a minimum, sturdy leather boots above the ankles, safety glass with side shields, and hard hats. For this project, the sturdy leather boots will be upgraded to sturdy leather safety-toed boots.

The type of PPE will be selected, issued, used, and maintained in accordance with PRD-2001 or PRD-5121. Selection of the proper PPE is based on the following considerations:

- Specific conditions and nature of the tasks
- Potential contaminant routes of entry
- Physical form and chemical characteristics of hazardous materials, chemicals, or waste
- Toxicity of hazardous materials, chemicals, or waste that may be encountered
- Duration and intensity of exposure (acute or chronic)
- Compatibility of chemical(s) with PPE materials and potential for degradation or breakthrough
- Environmental conditions (e.g., humidity, heat, cold, rain)
- The hazard analysis (Section 2) evaluation of this HASP.

Though not expected, if radiological contamination is encountered at levels requiring the use of anti-contamination clothing, a task-specific RWP will be developed and MCP-432 will be followed.

The PPE requirements for all tasks include, at a minimum, a hard hat, safety glasses with side shields, and sturdy leather steel-toe boots. Specific tasks may require additional PPE (i.e., asbestos removal and sampling activities), which will be documented on an appropriate work control document (e.g., TPR, JSA, and RWP). Potential exposures and hazards will be monitored (as discussed in Section 3) during the course of the project to evaluate changing conditions and to determine PPE level adequacy and modifications.

5.1 Respiratory Protection

In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective will be to prevent atmospheric contamination. This will be accomplished as far as feasible by accepted engineering control measures (wetting and misting). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators will be selected and used.

Required task-based respiratory protection and protective clothing will be listed on an appropriate work control document (e.g., TPR, JSA, and RWP) for that task. If respiratory protection is required, all personnel required to wear respirators will complete training, receive medical approval, and be fit-tested before being assigned a respirator in accordance with the training and documentation requirements in Section 6. Requirements for respirator use, emergency use, storage, cleaning, and maintenance—as stated in MCP-2726, "Respiratory Protection,"—will be followed.

5.2 Personal Protective Equipment Levels

Table 5-1 lists PPE requirements for the four levels of PPE that may be worn during the course of the project. It is anticipated that only PPE Levels D and C will be required for conducting project tasks. Modifications to these levels will be made under the direction of the HSO in consultation with the project Industrial Hygiene and RadCon personnel, as appropriate. Such modifications are routinely employed during hazardous waste operations and emergency response (HAZWOPER) site activities to maximize efficiency and to meet site-specific needs without compromising personnel safety and health.

5.2.1 Level D Personal Protective Equipment

Level D PPE will only be selected for protective clothing and not on a site with respiratory or skin absorption hazards requiring whole-body protection. Level D PPE provides no protection against airborne chemical hazards, but rather is used for protection against surface contamination and physical hazards. Level D PPE will only be allowed in areas that have been characterized as having limited contamination hazards.

5.2.2 Level C Personal Protective Equipment

Level C PPE will be worn when the task site chemical or radiological contaminants have been well-characterized, indicating that personnel are protected from airborne exposures by wearing an air-purifying respirator with the appropriate cartridges, no oxygen-deficient environments exist (less than 19.5% at sea level), and that there are no conditions that pose immediate danger to life or health.

Table 5-1. Levels and options of personal protective equipment.

Personal Protective Equipment Level	Personal Protective Equipment Required	Optional Personal Protective Equipment or Modifications
D	Coveralls or standard work clothes (coverall material type based on industrial hygiene determination). Hard hat meeting ANSI Z89.1 requirements. Eye protection (safety glasses meeting ANSI Z87.1 requirements as a minimum). Hand protection (material based on type of work and hazardous materials being handled). Safety footwear (steel or protective toe and shank) meeting ANSI Z41.	Chemical or radiological protective clothing (Tyvek or Saranex) by industrial hygienist or RCT. Chemically resistant hand and foot protection (e.g., inner and outer gloves and boot liners). Radiological modesty garments under outer protective clothing (as required by RWP). Any specialized protective equipment (e.g., hearing protection, cryogenic gloves, face shields, welding goggles, and aprons).
C	Level D ensemble with the following respiratory and whole-body protection upgrades:[a] • Full-facepiece air purifying respirator equipped with a NIOSH-approved HEPA filter or chemical combination cartridge (industrial hygienist to specify cartridge type) • Standard Tyvek (or equivalent) coverall **OR** • Chemical-resistant coveralls (e.g., Tyvek QC, Tychem 7500, or Saranex-23-P) (industrial hygienist to specify material).	Chemical-resistant outer shoe or boot cover (industrial hygienist or RCT to specify material). Inner chemical-resistant gloves with cotton liners (as determined by the industrial hygienist and RWP). Outer chemical-resistant gloves (as determined by the industrial hygienist). Radiological modesty garments under outer protective clothing (as required by RWP). Any specialized protective equipment (e.g., hearing protection, welding lens, and aprons).

Table 5-1. (continued).

Personal Protective Equipment Level	Personal Protective Equipment Required	Optional Personal Protective Equipment or Modifications
B	Level C ensemble with the following respiratory and whole body protection upgrades:[a,b] • Chemical-resistant coveralls or encapsulating suit (Tyvek QC, Tychem 7500, Saranex 23-C, or equivalent) • Any other chemical or radiological PPE prescribed in the site-specific RWP or safe work permit • Chemical-resistant butyl or one-time-use natural latex outer boots (as determined by the industrial hygienist and RWP) • Inner chemical-resistant gloves with cotton liners (as determined by the industrial hygienist and RWP) • Outer chemical-resistant Viton or polyvinyl alcohol gloves (as determined by the industrial hygienist).	Chemical-resistant outer shoe or boot cover (industrial hygienist or RCT to specify material). Radiological modesty garments under outer protective clothing (as required by RWP). Any specialized protective equipment (e.g., hearing protection, welding lens, and aprons).
NOTE:	*All seams must be taped and secured to prevent skin contact from hazardous substances in a soil, liquid, mist, and aerosolized form.*	
A	Level B ensemble with the following respiratory and whole body protection upgrades:[a,b] • Open circuit SCBA or a full-facepiece supplied air respirator with a 15-minute escape-only SCBA bottle operated in a continuous-flow mode (supplied air respirator hose length of less than 91 m [300 ft]) • Fully encapsulating, chemical-resistant suit (Barricade, Tychem 10000, or equivalent) • Chemical-resistant or one-time-use outer boots (as determined by the industrial hygienist and RWP) • Inner chemical-resistant gloves with cotton liners (as determined by the industrial hygienist and RWP) • Outer chemical-resistant gloves (as determined by the industrial hygienist).	Chemical-resistant outer shoe or boot cover (industrial hygienist or RCT to specify material). Radiological modesty garments under outer protective clothing (as required by RWP). Any specialized protective equipment (hearing protection, welding lens, and aprons).

a. Upgrades are determined by the industrial hygienist in conjunction with other environment, safety, and health professionals.
b. Level B and A work will require approval from the Environmental Restoration Program safety, health, and quality assurance manager and coordination with the INEEL fire department.
HEPA = high-efficiency particulate air
SCBA = self-contained breathing apparatus

NOTE: *Personnel must inspect all PPE before donning and prior to entry into any work zone. Items found to be defective or that become unserviceable during use will be doffed and disposed of in accordance with posted procedures and placed into the appropriate waste stream. The PPE inspection guidance is provided in Table 5-3.*

5.3 Personal Protective Clothing Upgrading and Downgrading

The project HSO, in consultation with the project industrial hygienist and RadCon personnel, will be responsible for determining when to upgrade or downgrade PPE requirements. Upgrading or downgrading PPE, based on changing site conditions or activities, is a normal occurrence. Action levels listed in Table 3-2 serve as the initial basis for making such decisions. Additional reasons for upgrading or downgrading are listed in the following subsections.

5.3.1 Upgrading Criteria for Personal Protective Equipment

The level of PPE required will be upgraded for the following reasons and work will halt until PPE upgrading has been completed:

- Identification of new, unstable, or unpredictable site hazards
- Temporary loss or failure of any engineering controls
- Contaminants that present difficulty in monitoring or detecting
- Known or suspected presence of skin absorption hazards
- Identified source or potential source of respiratory hazard(s) not anticipated
- Change in the task procedure that may result in increased contact with contaminants or meeting any of the criteria listed above.

5.3.2 Downgrading Criteria

The level of PPE will be downgraded under the following conditions:

- Elimination of hazard or completion of task(s) requiring specific PPE
- Implementation of new engineering or administrative controls that eliminate or significantly mitigate the hazard
- Sampling information or monitoring data that show the contaminant levels to be stable and lower than established action limits
- Elimination of potential skin absorption or contact hazards.

5.4 Inspection of Personal Protective Equipment

All PPE ensemble components must be inspected before use and when in use within project work zones. Self-inspection and the use of the buddy system, once PPE is donned, will serve as the principle forms of inspection. If PPE should become damaged or degradation or permeation is suspected, the individual wearing the PPE will inform others of the problem and proceed directly to the work zone exit point to doff and replace the unserviceable PPE. Table 5-3 provides an inspection checklist for common PPE items. Where specialized protective clothing or respiratory protection is used or required, the manufacturer's inspection requirements in conjunction with regulatory or industry inspection practices will be followed. Consult the project industrial hygienist, safety professional, and RCT about PPE inspection criteria.

Table 5-3. Inspection checklist for personal protective equipment.

Personal Protective Equipment Item	Inspection
Respirators (full-facepiece air-purifying)	**Before use:** Check condition of the facepiece, head straps, valves, connecting lines, fittings, and all connections for tightness. Check cartridge to ensure proper type or combination is being used for atmospheric hazards to be encountered and inspect threads and O-rings for pliability, deterioration, and distortion.
Level D, C, and B clothing	**Before use:** Visually inspect for imperfect seams, nonuniform coatings, and tears. Hold PPE up to the light and inspect for pinholes, deterioration, stiffness, and cracks. **While wearing in the work zone:** Inspect for evidence of chemical attack such as discoloration, swelling, softening, and material degradation. Inspect for tears, punctures, and zipper or seam damage. Check all taped areas to ensure that they are still intact.
Gloves	**Before use:** Pressurize rubber gloves to check for pinholes: blow in the glove, then roll until air is trapped and inspect. No air should escape. **Leather gloves:** Inspect seams and glove surface for tears and splitting and verify no permeation has taken place.

6. PERSONNEL TRAINING

All INEEL personnel will receive training, as specified in 29 CFR 1910.120 and INEEL companywide manuals, as applicable. Table 6-1 summarizes the project-specific training requirements for personnel-based access requirements, responsibilities at the project site, potential hazards, and training level requirements.

Modifications (e.g., additions to or elimination of) to training requirements listed in Table 6-1 may be necessary based on changing field conditions. Any changes to the requirements listed in Table 6-1 must be approved by the HSO, with concurrence from the FTL, project manager, RCT, and industrial hygienist, as applicable. These changes should be based on site-specific conditions and will generally be considered a minor change to the HASP, as defined by instructions from Form 412.11, "Document Management Control Systems (DMCS) Document Action Request (DAR)," because they are administrative in nature.

6.1 General Training

All project personnel are responsible for meeting training requirements including applicable refresher training. Evidence of training will be maintained at the project site, field administrative location, or electronically (e.g., Training Records and Information Network [TRAIN] [INEEL 2001]). Nonfield team personnel and visitors must be able to provide evidence of meeting required training for the area of the site they wish to access before being allowed into a project area. As a minimum, all personnel who access project locations must receive a site-specific briefing, are required to wear PPE, and must provide objective evidence of having completed INEEL computer-based PPE training (00TRN288, "Personal Protective Equipment") or equivalent, in accordance with 29 CFR 1910.132, "Personal Protective Equipment."

6.2 Project-Specific Training

Before beginning work at the project site, field team members will receive project-specific HASP training that will be conducted by the HSO (or designee). This training will consist of a complete review of (1) a controlled copy of the project HASP, attachments, and DARs; (2) applicable JSAs; (3) work orders; and (4) other applicable work control and work authorization documents, with time for discussion and questions. Project-specific training can be conducted in conjunction with, or separately from, the required formal prejob briefing (MCP-3003).

At the time of project-specific HASP training, personnel training records will be checked and verified to be current and complete for all the training requirements shown in Table 6-1. After the HSO (or designee) has completed the site-specific training, personnel will sign Form 361.25, "Group Read and Sign Training Roster," (or equivalent) indicating that they have received this training; understand the project tasks, associated hazards, and mitigations; and agree to follow all HASP and other applicable work control and safety requirements. Form 361.25 (or equivalent) training forms are available on the INEEL Intranet under "Forms."

A trained HAZWOPER 8-hour supervisor (FTL or other person who has been trained by the HAZWOPER supervisor) will monitor the performance of each newly 24-hour or 40-hour trained worker to meet the 1 or 3 days of supervised field experience, respectively, in accordance with 29 CFR 1910.120. Following the supervised field experience period, the supervisor will complete Form 361.47, "HAZWOPER Supervised Field Experience Verification," (or equivalent) to document the supervised field experience.

Table 6-1. Required project-specific training.

Required Training	FTL and HSO	Other Field Team Members	Access into the Contamination Reduction Zone	Access to Project Areas Outside Contamination Reduction Zone
40-hour HAZWOPER[a]	Yes	b	b	
24-hour HAZWOPER[a]		b	b	
Project-specific HASP training[c]	Yes	Yes	Yes	
Project-site orientation briefing[d]				Yes
Fire extinguisher training (or equivalent)	e	e		
Cardiopulmonary resuscitation, medic first-aid	e	e		
Respirator training	f	f		
Asbestos awareness	g	g	g	
Asbestos worker		h		

NOTE: *Shaded fields indicate specific training is not required or applicable.*

a. Includes 8-hour HAZWOPER refresher training, as applicable, and supervised field experience as follows: 40-hour HAZWOPER = 24-hour supervised field experience and 24-hour HAZWOPER = 8-hour supervised field experience.

b. 40-hour or 24-hour HAZWOPER training requirement will be determined by the HSO based on the nature of the project tasks and potential for exposure to contaminants or safety hazards.

c. Includes project-specific hazard communications (29 CFR 1910.1200), site-access and security, decontamination, and emergency response actions, as required by 29 CFR 1910.120(e).

d. Orientation includes briefing of site hazards, designated work areas, emergency response actions, and PPE requirements. Personnel receiving project-site orientation briefing only are limited to the areas outside designated work areas and must be escorted by a project supervisor or designee who is fully trained on the requirements of the HASP.

e. At least two trained personnel should be onsite when the field team is working. The HSO will determine appropriate number of personnel requiring training.

f. Only required if entering area requiring respiratory protection.

g. Required for all personnel entering work zone while asbestos removal work is occurring, but who are not performing asbestos removal.

h. Required for ground personnel performing asbestos removal work.

NOTE 1: *Supervised field experience is only required if personnel have not previously completed this training at another Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC § 9601) site (documented) or they are upgrading from 24- to 40-hour HAZWOPER training. A copy of the training record must be kept at the project site as evidence of training or be available electronically.*

NOTE 2: *Completed training project forms (Form 361.47 or equivalent) should be submitted to the Environmental Restoration Program training coordinator for inclusion in the TRAIN Network system within 5 working days of completion.*

6.3 Plan of the Day Briefing, Feedback, and Lessons Learned

A daily plan-of-the-day (POD) or equivalent meeting will be conducted by the subcontract technical representative, FTL, subcontractor job site supervisor, or other designee. During this meeting, daily tasks are to be outlined; hazards identified; hazard controls, mitigation, and work zones established; PPE requirements discussed; and feedback from personnel solicited. At the completion of this meeting, any new work control documents will be reviewed and signed (e.g., JSA or RWP).

NOTE: *If a formal MCP-3003 prejob briefing is conducted during the work shift, a POD is not required.*

Particular emphasis will be placed on lessons learned from the previous workday's activities and how tasks can be completed in the safest, most efficient manner. All personnel are encouraged to contribute ideas to enhance worker safety and mitigate potential exposures at the project sites. This POD will be conducted as an informal meeting and the only required record will be to document the completion of the POD in the FTL, subcontract technical representative, or sampling logbook.

Safety and health topic-specific training or safety meetings may also be conducted during the course of the project to reinforce key safety topics. They may be conducted by project safety and the industrial hygienist or any field team member and should be performed in conjunction with the POD. Credit for a safety meeting can be received for such topic-specific training if a tailgate training form (INEEL Form 361.24), "Tailgate Attendance Roster," or equivalent is completed and submitted to the appropriate training coordinator for entry into the TRAIN system.

7. SITE CONTROL AND SECURITY

Site control and security will be maintained at the project site during all activities to prevent unauthorized personnel from entering the work area. Entry into and exit out of these areas will be controlled through the appropriate use of barriers, signs, and other measures in accordance with PRD-2022, "Safety Signs, Color Codes, and Barriers," or PRD-5117, "Accident Prevention Signs, Tags, Barriers, and Color Codes."

The HSO and safety professional should be consulted regarding equipment layout at the project site (in conjunction with the subcontractor superintendent for subcontractor-owned equipment) to minimize personnel hazards from equipment. The focus should be on equipment with stored energy (electrical, pressurized systems, elevated materials/equipment, chemical), moving and rotating parts (equipment that is guarded and that has open rotating parts such as a drill rig), and other equipment with the potential to result in personnel injuries from being struck-by, caught-between, or entangled in such equipment. The layout of equipment at the project site should reflect the nature of the hazard presented and should be mitigated through the use of engineering controls (barriers, guards, isolation), administrative controls (roped off restricted areas or controlled entry access), and qualifications of operators and those assisting in the operation of the equipment, when required.

Good housekeeping will be maintained at all times during the course of the project to include maintaining working and walking surfaces to minimize tripping hazards, stacking or storing in a centralized location materials and equipment when not in use, and regular cleanup of debris and trash that may accumulate at the project site.

Both radiological and nonradiological hazards (including industrial safety hazards) will be evaluated when establishing the initial work zone size, configuration, and location. Common barriers may be used to delineate both radiological and nonradiological work-zone postings, depending on the nature and extent of contamination. If common barriers are used, they will be delineated and posted in accordance with both sets of requirements (29 CFR 1910.120 and 10 CFR 835), using appropriately colored rope and postings. During asbestos-containing roofing material removal, work areas will also be posted in accordance with MCP-2859, "Posting Asbestos Advisory Signs."

Visitors may be admitted into work areas provided they (1) are on official business; (2) have received site-specific training or orientation by the FTL or designee; (3) have met all the site-specific training requirements for the area they have a demonstrated need to access (including PPE training), as listed on Table 6-1; and (4) wear all required PPE.

NOTE: *Visitors may not be allowed into controlled work areas during certain tasks to minimize risks to workers and visitors. The determination as to any visitor's need for access into the controlled work area will be made by the FTL in consultation with the HSO.*

7.1 Exclusion Zone

The exclusion zone will be large enough to encompass the primary task area and to allow equipment and personnel to move about freely and conduct necessary tasks. The minimum number of personnel required to safely perform project tasks will be allowed into the exclusion zone. If the exclusion zone will be relocated to another site or reconfigured, it will be delineated in a configuration large enough to prevent nonfield team personnel in the support zone from being exposed to potential safety and health hazards. The exclusion zone's shape and size will be based on the tasks being conducted, existing structures and facilities, and potential for impact to adjacent areas from project tasks or contaminants.

The exclusion zone is a controlled access zone at all times. An entry and exit point will be established at the periphery of the exclusion zone and contamination reduction corridor (CRC) to regulate the flow of personnel and equipment. The exclusion zone's boundary will be delineated with rope or printed hazard ribbon and posted with signs in accordance with PRD-5117 or PRD-2022, and MCP-2859.

Factors that will be considered when establishing the exclusion zone boundary include (1) tasks being conducted, (2) air monitoring data, (3) equipment in use, (4) the physical area necessary to conduct site operations, and (5) the potential for contaminants to be blown from the area. The boundary may be expanded or contracted as these factors change or additional monitoring information becomes available. All personnel who enter the exclusion zone will wear the appropriate level of PPE for the hazards present and have required training as listed in Sections 5 and 6 of this HASP, respectively.

7.2 Contamination Reduction Zone and Corridor

The contamination reduction zone (CRZ) and CRC are transition areas surrounding the exclusion zone and are located between the exclusion zone and support zone (see Figure 7-1). The CRZ may be delineated by the existing fence around the CFA-04 pond. The CRZ and CRC will serve to buffer the support zone from potentially contaminated exclusion zone areas. The CRZ and CRC may serve as staging areas for equipment and temporary rest areas for personnel.

7.3 Support Zone

The support zone will be considered a "clean" area. The location of the support zone will be in a prevailing upwind direction from the exclusion zone (where possible) and readily accessible from the nearest road. The support zone is a designated area or building outside the CRZ and does not have to be delineated. Support trailers, vehicle parking, additional emergency equipment, extra PPE, and stored monitoring and sampling equipment may be located in the support zone. Visitors who do not have appropriate training to enter other project areas will be restricted to this zone.

7.4 Site Security

All project site areas will be secured and controlled during normal work hours, as described in the previous sections. During nonworking hours, the general project sites located inside INEEL facilities are controlled by the facility fence and normal security access requirements. However, additional project site security and control will be required to prevent unauthorized personnel from entering the project area and being exposed to potential safety or health hazards. This will be accomplished by delineating project areas with rope or fence boundaries and posting where hazards are left unmitigated (e.g., open trenches, exposed contaminated soils, or equipment left onsite). Signage will be left in place during off-hours and weekends to prevent personnel from inadvertently entering the area.

The FTL has the primary responsibility for ensuring that the project area is secured. The FTL will ensure that all of the area's health and safety postings are intact when leaving the site and will be responsible for maintaining them for the duration of the project. Project personnel are trained about site access and control requirements during project-specific HASP training and will not cross roped areas without the proper training and authorization, regardless of whether a sign is in place or not.

NOTE: *Signs are routinely lost because of high winds and will be replaced as soon as possible the next working day following discovery.*

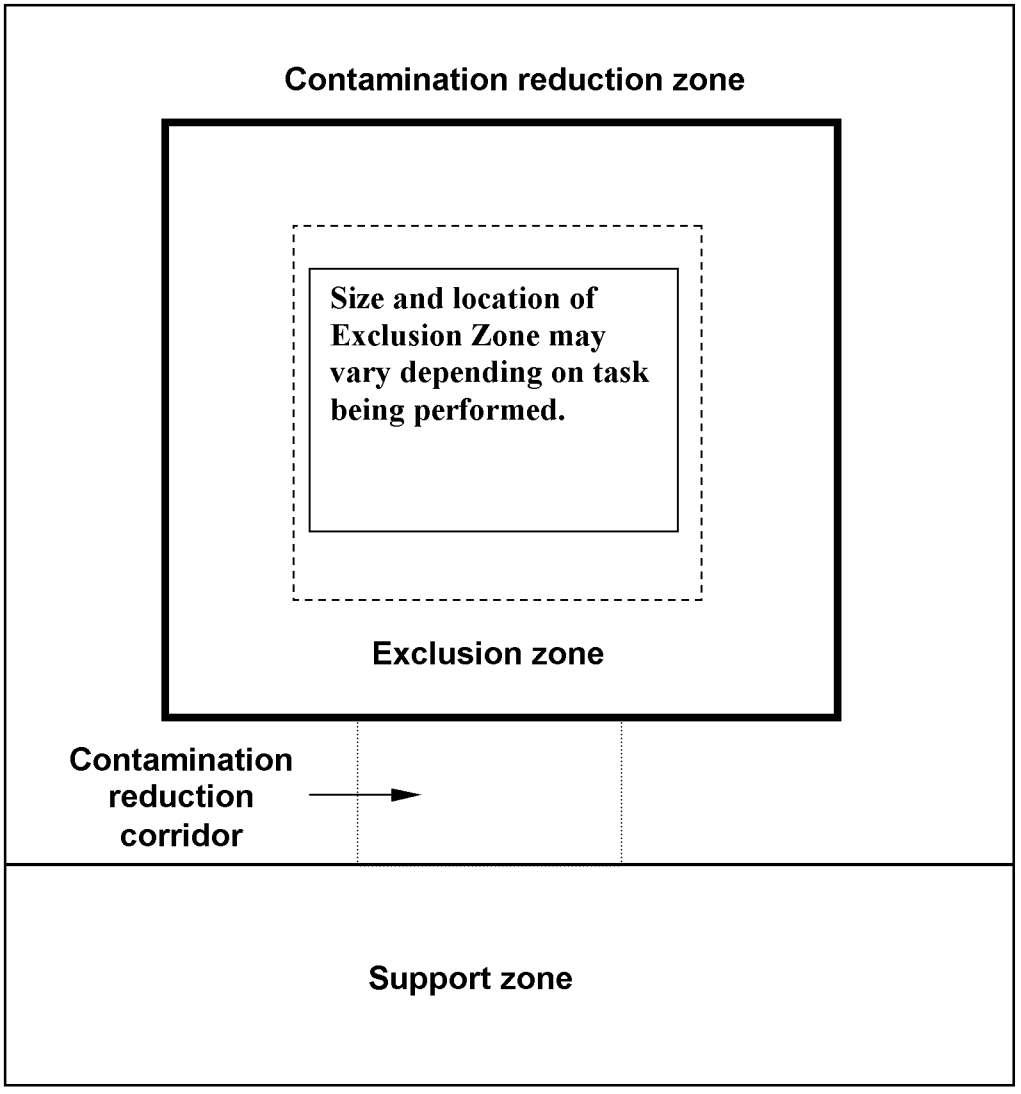


Figure 7-1. General work zones.

7.5 Wash Facilities and Designated Eating Areas

Ingestion of hazardous substances is possible when workers do not practice good personal hygiene habits. It is important to wash hands, face, and other exposed skin thoroughly after completion of work and before smoking, eating, drinking, and chewing gum or tobacco. For project personnel, the support zone will serve as the designated eating area. Moist hand towelettes may be provided to assist project personnel in hand washing. Nearby CFA facility restrooms will serve as wash facilities for washing with soap and water.

7.6 Designated Smoking Area

Smoking will only be permitted in designated smoking areas and personnel will comply with all INEEL smoking polices including disposing of smoking materials in the proper receptacle. Smoking will not be permitted outside facilities without establishing a designated smoking area. The project safety professional in consultation with the designated fire protection engineer will be the single point of contact for establishing any smoking area outside facilities and such areas may not be permitted at certain times of the year because of high or extreme fire danger.

8. OCCUPATIONAL MEDICAL SURVEILLANCE

Task-site personnel will participate in the INEEL occupational medical surveillance program (or equivalent subcontractor program), as required by DOE Order 440.1, "Worker Protection Management for DOE Federal and Contractor Employees," and 29 CFR 1910.120. Medical surveillance examinations will be provided before assignment, annually, and after termination of HAZWOPER duties or employment. This includes

- Personnel who are, or may be, exposed to hazardous substances at or above the OSHA PEL, or published exposure limits, without regard to respirator use for 30 or more days per year
- All employees who are injured, become ill, or develop signs or symptoms because of possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation
- All employees who wear a respirator for 30 days or more a year or as required by "Respiratory Protection" (29 CFR 1910.134).

Personnel who wear a respirator in performance of their job, or who are required to take respirator training to perform their duties under this plan, must participate in the medical evaluation program for respirator use at least annually, as required by MCP-2726 or PRD-2109, "Respiratory Protection."

A single copy of the project HASP, job hazard analysis requirements, required PPE, confined space entry requirements (as applicable), and other exposure-related information will be made available, upon request, to the INEEL OMP physician (and subcontractor physicians) conducting medical surveillance for employees participating in this project. Exposure monitoring results and hazard information furnished to the OMP physician will be supplemented or updated annually (as stated in Section 12) as long as the employee is required to maintain a hazardous waste and material employee medical clearance. The OMP physician will then evaluate the physical ability of an employee to perform the assigned work.

A documented medical clearance (e.g., a physician's written opinion) will be provided to the employee and line management stating whether the employee has any detected medical condition that would place him or her at increased risk of health impairment from working in hazardous waste operations, emergency response operations, respirator use areas, and confined space areas, as applicable. The physician may impose restrictions on the employee by limiting the amount and type of work performed.

Personnel are responsible for communicating any work or medical restrictions to their supervisor so modified work assignments can be made if necessary. During the MCP-3003 prejob briefing, the supervisor conducting the briefing should ask workers if they have any work restrictions. However, it is the employee's responsibility to inform the supervisor of any work or medical restrictions.

8.1 Subcontractor Workers

Subcontractor project personnel will participate in a subcontractor medical surveillance program that satisfies the applicable requirements of 29 CFR 1910.120. This program must make medical examinations available before assignment, annually, and after termination of hazardous waste duties as stated above. The physician's written opinion, as defined by 29 CFR 1910.120(f)(7) (or equivalent), will serve as documentation that subcontractor personnel are fit for duty or will list work restrictions.

Medical data from the subcontractor employee's private physician, collected pursuant to hazardous material worker qualification, will be made available to the INEEL OMP physicians on request.

8.2 Injuries on the Site

It is the policy of the INEEL that an INEEL OMP physician examine all injured personnel for the following reasons:

- An employee is injured on the job
- An employee is experiencing signs and symptoms consistent with exposure to a hazardous material
- An employee is believed to have been exposed to toxic substances or physical or radiological agents in excess of allowable limits during the course of a project at the INEEL.

NOTE: *In the event of an illness or injury, the decision to provide first aid and transport to the nearest medical facility or whether to immediately request an ambulance and continue to stabilize and provide first aid should be based on the nature of the injury or illness and likelihood that transporting the individual may cause further injury or harm. Most likely, the person making this decision will only be trained to the medic first/cardiopulmonary resuscitation (CPR) level and should contact the CFA medical facility at 777 or 526-1515 for further guidance if there is any question as to the extent of injury or potential to cause further harm by movement of the injured individual.*

In the event of a known or suspected injury or illness caused by exposure to a hazardous substance or physical or radiological agent, the employee will be transported to the nearest INEEL medical facility for evaluation and treatment, as necessary. The HSO and FTL are responsible for obtaining as much of the following information as is available to accompany the individual to the medical facility:

- Name, job title, work (site) location, and supervisor's name and phone number
- Substance, physical or radiological agent exposed to (known or suspected), and material safety data sheet, if available
- Nature of the incident and injury or exposure and associated signs or symptoms of exposure
- First aid or other measures taken
- Locations, dates, and results of any relevant personal or area exposure monitoring or sampling
- List of PPE worn during this work (e.g., type of respirator and cartridge used).

Further medical evaluation will be determined by the treating or examining physician in accordance with the signs and symptoms observed, hazard involved, exposure level, and specific medical surveillance requirements established by the OMP director in compliance with 29 CFR 1910.120.

NOTE: *In the event of an illness or injury, subcontractor employees will be taken to the CFA medical facility (if doing so will not cause further injury or harm) or be transported by INEEL ambulance to have an injury stabilized before transport to the subcontractor's treating physician or off-Site medical facility.*

The CFA site area director will be contacted if any injury or illness occurs at a project site. As soon as possible after an injured employee has been transported to the INEEL medical facility, the FTL or designee will make notifications as indicated in Section 10.

8.3 Substance-Specific Medical Surveillance

Medical surveillance requirements will be implemented for all ground personnel conducting asbestos removal operations in accordance with MCP-2862, "Asbestos Management Program Administration."

9. KEY SITE PERSONNEL RESPONSIBILITIES

The organizational structure for this project reflects the resources and expertise required to perform the work while minimizing risks to worker health and safety, the environment, and the public. Key project positions, lines of responsibility and communication, and the project within the Environmental Restoration Program structure are shown on the organization chart for the Site (see Figure 9-1). This organization chart is not all-inclusive, but shows the structure for key resources assigned to complete project tasks. The Environmental Restoration Program Management Plan and project-specific Project Execution Plan detail roles and responsibilities for Environmental Restoration Program personnel above the project manager level. The following text outlines the responsibilities of key site personnel.

9.1 Environmental Restoration Program and Project Management

The following positions and associated roles and responsibilities are described in the Environmental Restoration Program Management Plan and Project Execution Plan:

- Environmental Restoration manager of projects
- Environmental Restoration Program safety, health, and quality assurance manager
- Waste Area Group (WAG) 4 manager
- Project engineer
- Environmental Compliance support
- Quality engineer.

9.1.1 Project Manager

The project manager is responsible for the development and management of the project and the coordination of Environmental Restoration project operations. The project manager ensures that operations, *Federal Facility Agreement and Consent Order* (DOE-ID 1991) compliance support, surveillance, and monitoring activities are conducted in accordance with INEEL MCPs and PRDs; all applicable OSHA, U.S. Environmental Protection Agency, DOE, U.S. Department of Transportation, and State of Idaho requirements; and that tasks comply with Plan (PLN) -694, "Environmental Restoration Program Management Plan," and this HASP. The project manager is responsible for the overall work scope, schedule, and budget for this project and reports to the Environmental Restoration WAG manager.

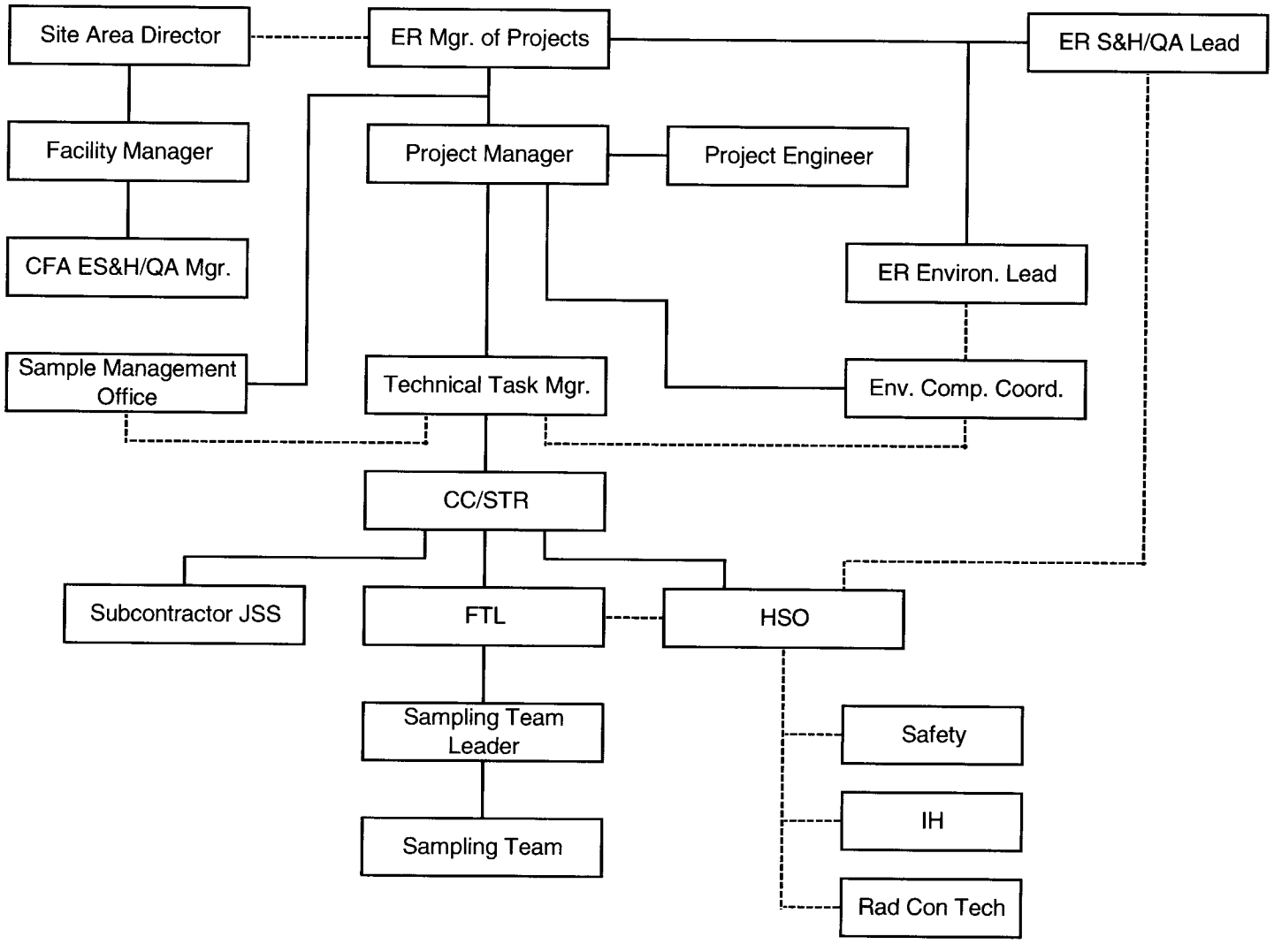


Figure 9-1. CFA-04 organization chart.

9.2 Task Site Responsibilities

9.2.1 Field Team Leader

The FTL represents the Environmental Restoration organization at project site(s) with delegated responsibility for the safe and successful completion of the project tasks. The FTL will manage tasks and execute the applicable field sampling plans, technical procedures, and other project-specific documents. The FTL may serve as the sampling FTL and may serve as the HSO based on the qualifications and complexity of the activities. The FTL enforces site control, documents activities, and conducts (or may delegate to an appropriately trained alternate) the POD meeting or prejob briefing at the start of the shift. Health and safety issues must be brought to the attention of the FTL. The FTL will report project status on a regular basis to the project manager. Additional responsibilities include, but are not limited to, the following:

- Ensuring that all field activities are conducted in compliance with technical procedures, work orders, and associated ISMS requirements
- Ensuring field team personnel comply with CFA facility and operation requirements (as applicable)
- Obtaining and coordinating all resources needed to implement the fieldwork including equipment, labor, and administrative and technical permits and approvals
- Coordinating with the facility interface to schedule routine monitoring tasks through the facility POD
- Directing subcontract personnel supporting tasks at the project site.

If the FTL leaves the site, an alternate individual will be appointed and that information communicated to all field personnel. Persons acting as FTL must meet all the FTL training requirements outlined in Section 6.

9.2.2 Health and Safety Officer

The HSO is the person assigned to the task site who serves as the primary contact for all health and safety issues. The HSO advises the FTL on all aspects of health and safety and is authorized to stop work at the task site if any operation threatens worker or public health or safety. The HSO is authorized to verify compliance to the HASP, conduct inspections and self-assessments, require and monitor corrective actions, and monitor decontamination procedures (as appropriate). The safety, health, and quality assurance professionals at the task site (e.g., safety professional, industrial hygienist, environmental coordinator, and facility representative) support the HSO.

Persons assigned as the HSO or alternate HSO must be qualified (in accordance with the definition in 29 CFR 1910.120) to recognize and evaluate hazards, and will be given the authority to take or direct actions to ensure that workers are protected. While the HSO may also be the industrial hygienist, safety professional, or in some cases the FTL (depending on the hazards and complexity of the activity involved), other task-site responsibilities of the HSO must not interfere with the primary role of the HSO at the task site.

If it is necessary for the HSO to leave the site, an alternate individual will be appointed by the HSO to fulfill this role and that person's identity will be communicated to project personnel.

9.2.3 Industrial Hygienist

The assigned industrial hygienist is the primary source for information about exposure assessments for the project chemical, physical, and biological hazards at the task site. The industrial hygienist assesses the potential for worker exposures to hazardous agents in accordance with companywide safety and health manuals, MCPs, and industry-accepted industrial hygiene practices and protocol. By participating in project planning, the industrial hygienist assesses and recommends appropriate hazard controls for the protection of site personnel, operates and maintains airborne sampling and monitoring equipment, reviews engineering controls for effectiveness, and recommends and assesses the use of PPE required in this HASP (recommending changes as appropriate).

Personnel showing health effects (i.e., signs and symptoms) resulting from possible exposure to hazardous agents will be referred to an OMP physician by the industrial hygienist, supervisor, or HSO. The industrial hygienist may have other duties at the site as specified in other sections of this HASP or in PRDs or MCPs.

9.2.4 Safety Professional

The assigned safety professional reviews work packages, observes site activity, assesses compliance with the companywide safety and health manuals, advises the FTL on required safety equipment, and recommends solutions to safety issues and concerns that arise at the task site. The safety professional may conduct periodic inspections in accordance with MCP-3449 and have other duties at the task site as specified in other sections of this HASP or in PRDs and MCPs. Copies of any safety and health inspections will be kept in the project field file.

9.2.5 Radiological Control Technician

The assigned RCT is the primary source for information and guidance on radiological hazards that may be encountered during project tasks and controls necessary to mitigate them. Responsibilities of the RCT include the following:

- Performing radiological surveying of the site, equipment, and samples
- Providing guidance for radioactive decontamination of equipment and personnel
- Accompanying the affected personnel to the nearest INEEL medical facility for evaluation if significant radionuclide contamination occurs.

The RCT must notify the FTL and HSO of any radiological occurrence that must be reported, as directed by the *INEEL Radiological Control Manual*.

9.2.6 Fire Protection Engineer

A CFA fire protection engineer is available to provide technical guidance to the HSO and FTL about all fire protection issues and may be assigned to review the work packages and conduct preoperational and operational fire hazard assessments. The INEEL fire department may also need to be advised of fuel storage areas (if required) and will provide authorization for all hot work operations performed at the project site during times of high-to-extreme fire danger. The fire protection engineer is required to sign all safe work permits used as hot work permits within the jurisdiction of the their facility site area director (SAD).

9.2.7 Sampling Team

The sampling team will consist of the FTL and support personnel and is responsible for the collection, preservation, and shipping of all samples in accordance with the applicable field sampling plan and technical procedures. The industrial hygienist and safety professional will support the sampling team, as required, based on site-specific hazards and task evolutions. The sampling team will be led by a sampling FTL who may also perform other roles during the project.

9.2.8 Specialty Subcontractors

Specialty subcontractors will be used to support the pre-remedial action sampling activities. A subcontractor lead will serve as the single point of contact for all subcontractor communication at the site and report to the subcontract technical representative for all technical direction and interface issues at the project site. Subcontractor personnel will report any health and safety issues that arise to the subcontract technical representative or HSO and may stop work if an unsafe condition exists. The subcontractor lead will also be asked to provide hazard and mitigation information about the nature of their equipment or operations during the POD meeting and may participate in job-site hazard walkdowns, where appropriate.

9.2.9 Field Team Personnel

All field team personnel, including facility and subcontractor support personnel assigned to the project, will understand and comply with the requirements of this HASP. The FTL (or designee) will conduct a formal prejob briefing or POD meeting at the start of each shift. During the POD briefing, all daily tasks, associated hazards, hazard mitigation (e.g., engineering and administrative controls, required PPE, and work control documents), and emergency conditions and actions will be discussed. Input from the project HSO, industrial hygienist, and safety personnel (where assigned) will be provided to clarify task health and safety requirements, as deemed appropriate. All project personnel are encouraged to ask questions about site tasks and provide suggestions on ways to perform required tasks in a more safe and effective manner based on the lessons learned from previous routine monitoring activities.

Once at the project site, field team personnel are responsible for identifying any potentially unsafe situations or conditions to the FTL or HSO for corrective action.

NOTE: *If it is perceived that an unsafe condition poses an imminent danger, site personnel are authorized to stop work immediately and notify the FTL or HSO of the unsafe condition.*

9.2.10 Nonfield Team Personnel

All persons who may be at a project site and are not part of the field team (e.g., surveyors or others not assigned a field team support role) are considered nonfield team personnel, as defined by this HASP. A person will be considered onsite when they are present beyond the support zone boundary.

Nonfield team personnel are considered occasional site workers in accordance with HAZWOPER and must receive site-specific HASP training before entering work areas at the project site unless there is no potential for exposure and safety hazards are mitigated (e.g., during down time). In such a case, a site orientation briefing covering potential safety and health hazards, required PPE, and emergency actions is required before being granted access to the area. A site supervisor (e.g., HSO or FTL) will supervise nonfield team personnel who have not completed their 3 days of supervised field experience in accordance with the HAZWOPER.

9.2.11 Visitors

All visitors with official business at the project site (including INEEL personnel, representatives of DOE, and state or federal regulatory agencies) may only proceed beyond the support zone after meeting the following requirements:

- Receiving site-specific HASP training or hazard briefing based on specific tasks taking place
- Signing a HASP training roster and providing proof of having met all training requirements specified in Section 6 (or required access training for the area to be visited when project tasks are not being conducted)
- Participating in a prejob briefing in accordance with MCP-3003
- Providing objective evidence of PPE training and wearing the appropriate PPE for the area of the site to be accessed (29 CFR 1910.132).

If there is no potential for exposure to chemical, radiological, or safety hazards (e.g., down time), a visitor may be escorted at the project site after receiving a site orientation consisting of:

- An overview of the controlled areas at the site and access restrictions
- Potential general site hazards and mitigation
- Required PPE for entry to the site (must be trained to wear required PPE)
- Emergency action to take in case of a take-cover or evacuation alarm.

NOTE: *Visitors will not be allowed into controlled work areas (even with proper training) during certain tasks to minimize risks to visitors. The determination as to any visitor's need for access into the controlled work areas during such tasks will be made by the FTL in consultation with the HSO, safety professional, and RCT (as appropriate).*

A fully trained task-site representative (e.g., FTL or HSO [or a designated alternate]) will escort visitors when entering controlled areas of the project site, as site conditions warrant, and as deemed appropriate by the FTL.

A casual visitor to the task site is a person who does not have a specific task to perform or other official business to conduct at the project site. Casual visitors are not permitted in work zones or designated work areas at any project site.

9.3 CFA Facility Responsibilities

9.3.1 CFA Site Area Director

The CFA SAD reports to the director of site operations and interfaces with the facility operations manager. The CFA SAD is responsible for all activities and processes within the facility jurisdiction including oversight of work processes, planning, startup, and restart of operations.

9.3.2 CFA Work Authorization

All activities will be scheduled through the facility as well as through work packages and procedures. The FTL (or designee) will provide authorization (i.e., signature on work order or technical procedure) to initiate daily activities.

10. EMERGENCY RESPONSE PLAN

This emergency response plan defines the roles and responsibilities of project personnel during an emergency. Such an emergency could be at the project site, on a tenant facility or collocated facility, or a Site-wide emergency. This section provides details of the INEEL Emergency Response Organization (ERO) and "INEEL Emergency Plan/RCRA Contingency Plan" (PLN-114) information. Plan-114 describes the overall process developed to respond to and mitigate consequences of emergencies that might arise at the INEEL.

Plan-114 may be activated in response to events occurring at the project site, at the INEEL, or at the discretion of the emergency coordinator or emergency action manager. Once the INEEL plan is activated, project personnel will follow the direction and guidance communicated by the emergency coordinator.

NOTE: *The OSHA HAZWOPER definition of an emergency is not defined the same as classified by DOE Orders 151.1A, "Comprehensive Emergency Management System," and 232.1A, "Occurrence Reporting and Processing of Operations Information." For this reason, the term "event" will be used in this section when referring to project HAZWOPER emergencies.*

10.1 Pre-Emergency Planning

The "INEEL Emergency Plan/RCRA Contingency Plan" (PLN-114) provides the basis for preplanning all INEEL emergency events. This base plan is supplemented with INEEL facility-specific addendums. This preplanning makes it possible for the project to anticipate and appropriately respond to abnormal events that can affect project activity. Preplanning also ensures that the project emergency response program is integrated with that of the INEEL. Specific procedures for addressing emergency events and actions to be taken are further described in the facility-specific emergency-implementing procedures. Finally, the HASP addresses project-specific hazards, potential emergency events, and the actions to take following such events.

10.2 Emergency Preparation and Recognition

The sections for hazard identification and mitigation and accident prevention provided the strategy that will be followed at the project site to prevent accidents. Similarly, emergency preparation and recognition will also require project personnel to be constantly alert for potentially hazardous situations and signs and symptoms of chemical exposure or releases. All field personnel should be familiar with the techniques for hazard recognition and the assigned action levels and associated actions to be taken, as identified in Section 3.

MCP-2725, "Field Work at the INEEL," requirements for training, emergency actions, and notifications will be followed for all projects conducted outside facility boundaries, as described in MCP-2725.

Preparation and training on emergencies will include proper site access and egress procedures in response to project events and INEEL emergencies as part of the project-specific HASP training and facility access training (where applicable). Visitors will also receive this training on a graded approach based on their site access requirements. Visitor training will include alarm identification, location and use of communication equipment, location of site emergency equipment, and evacuation. Emergency phone numbers and evacuation route maps will be located in the project trailer.

On-scene response to and mitigation of site emergencies could require the response from both project personnel and INEEL fire department personnel. Emergencies could include the following scenarios:

- Accidents resulting in injury
- Fires
- Spills of hazardous or radiological materials
- Tornadoes, earthquakes, or other adverse natural phenomena
- Vehicle or transportation emergencies
- Safeguard and security emergencies
- Emergencies at nearby facilities that could prompt evacuation or take-cover actions at the task site.

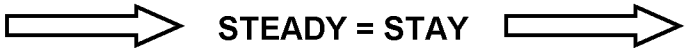
10.3 Emergency Alerting, Responses, and Sheltering

10.3.1 Alarms

Alarms and signals are used at the project site and the INEEL to notify personnel of abnormal conditions that require a specific response. Responses to these alarms are addressed in general employee training. Emergency sirens located throughout the INEEL serve as the primary means for signaling emergency TAKE COVER or EVACUATION protective actions. To signal site personnel of a project-initiated emergency event, a separate set of emergency signals has been established based on horn blasts (e.g., vehicle or air horn).

Depending on the field location (within or outside a facility), facility alarms may not be able to be heard at the project site. If the project site is outside the audible range of the facility alarms, then the notification to take cover or evacuate should be received on the field radio. The project signals will then be used to alert personnel of the emergency actions.

10.3.1.1 Take Cover—Continuous Siren. Radiation or hazardous material releases, adverse weather conditions, or other event or emergency conditions may require that all personnel take cover indoors in the nearest building. A TAKE COVER protective action may be initiated as part of a broader response to an emergency situation and may precede an evacuation order. The order to TAKE COVER is usually announced by activating the emergency siren. The signal to take cover is a CONTINUOUS SIREN.



However, the order to take cover can also be given by word of mouth, radio, or voice paging system. When ordered to TAKE COVER, project personnel will place the site and equipment in a safe configuration (as appropriate) and then seek shelter in the project trailer or vehicle (if outside the facility). Eating, drinking, and smoking are not permitted during take-cover conditions.

10.3.1.2 Total Area Evacuation—Alternating Siren. A total area evacuation is the complete withdrawal of personnel from the project site and the entire facility area. The evacuation signal is an

ALTERNATING SIREN. When ordered to EVACUATE, project personnel will place equipment and the site in a safe configuration (as appropriate) and then proceed along the specified evacuation route to the designated assembly area or as directed by the emergency coordinator.

For total area evacuations, the facility command post is activated and all personnel will gather at the primary facility evacuation assembly area or the location designated by the emergency coordinator or FTL if outside a facility. The FTL or trained alternate will then complete the personnel accountability using the attendance log. In this situation, the project area warden will report the results of the accountability process to the facility emergency coordinator.

10.3.1.3 Local Area Evacuation—Vehicle Horn Blast. A local area evacuation is the complete withdrawal of personnel from the project site, but it does not require the complete evacuation of the entire facility or INEEL area. A single long horn blast (e.g., vehicle) will serve as the project's primary emergency evacuation signal (as listed on Table 10-1). However, the order to evacuate can also be given by word of mouth, radio, or voice paging system. When ordered to evacuate the project site, personnel will place the site in a safe condition (as appropriate) and then proceed along the specified evacuation route to the assembly area designated for local area evacuations or as directed by the FTL. Eating, drinking, and smoking are not permitted during emergency evacuations.

Table 10-1. Project internal emergency signals.

Device or Communication Method	Signal and Associated Response
Vehicle horn blasts	**One long blast**—Emergency evacuation, evacuate project site immediately. Proceed in an upwind direction to designated assembly area as specified by the FTL.
	Two short blasts—Nonemergency evacuation of immediate work area. Proceed to designated assembly area as specified by the FTL.
	Three long blasts or verbally communicated—All clear, return to project site.

10.4 Personnel Roles, Lines of Authority, and Training

10.4.1 The Idaho National Engineering and Environmental Laboratory Emergency Response Organization

The INEEL ERO structures are based on the incident command system and are described in PLN-114 and facility-specific addendums to that plan.

10.4.2 Role of Project Personnel in Emergencies

Depending on the event, a graded response and subsequent notifications will take place. The FTL and project personnel responsibilities are described in the following subsections. Personnel will respond to emergencies only within the limits of their training and designated by their position. All personnel are trained to the facility-specific emergency actions as part of the access training or will be escorted by someone who has been trained. Emergency response actions will also be covered as part of the HASP briefing, as stated in Table 6-1.

10.4.2.1 Field Team Leader. The FTL (or designated alternate) is responsible for initiating all requests for emergency services (e.g., fire and medical) and for notifying the appropriate CFA personnel of abnormal (or potential emergency) events that may occur during the project. The FTL may also serve as the area warden (or designate that responsibility to another person who has been trained as area warden) and conduct personnel accountability. Personnel accountability will then be reported to the area director. The FTL will also control the scene until a higher-tiered incident command system authority arrives at the scene to take control. When relinquishing this role, the FTL (or designated alternate) will provide all information about the nature of the event, potential hazards, and other information requested.

10.4.2.2 Project Personnel. Every person at the project site has a role to play during a project event or INEEL emergency. Each employee must be constantly aware of potential problems or unexpectedly hazardous situations and immediately report these situations to the FTL. All personnel are expected to watch out for their fellow workers, to report their concerns to the FTL, and to take emergency actions as described in this section. Roles and responsibilities are further detailed in Table 10-2.

Table 10-2. Responsibilities during an emergency.

Responsible Person	Action Assigned
Field team leader (or designee)	Signal evacuation.
	Contact area director or Warning Communications Center (if the area director cannot be contacted).
Field team leader (or trained designee)	Serve as area warden and conduct accountability and report to area director.
Health and safety officer and medic and first-aid trained personnel	Administer first-aid to victims (voluntary basis only).

10.4.2.3 Personnel Accountability and Area Warden. Project personnel are required to evacuate the site in response to TAKE COVER, EVACUATION, and local evacuation alarms. In all cases, the FTL (or trained designee) will account for the people present on the project site. The FTL (or trained alternate) will serve as the area warden for the project and will complete the personnel accountability (following positive sweeps of the project site) based on the attendance log. The results of this accountability will then be communicated to the FTL for reporting to the area director or emergency coordinator (if the command post has been formed).

10.4.2.4 Spills. If the material spilled is known and is small enough to be safely contained at the task site, task-site personnel will handle spill control using spill supplies at the site and immediately report the incident to the INEEL spill notification team. If any release of a hazardous material occurs, task site personnel will comply with the following immediate spill response actions.

10.4.2.4.1 Untrained Initial Responder—The requirements for the untrained initial responder (or if the material characteristics are unknown) are listed below:

- Place equipment in a safe configuration
- **Evacuate** and **isolate** the immediate area
- Notify and then **seek help** from and **warn** others in the area
- Notify the FTL.

10.4.2.5 Trained Responder. The requirements for the trained responder where material characteristics are known and no additional PPE is required are listed below:

- Place all equipment in a secure configuration
- **Seek help** from and **warn** others in the area
- **Stop** the spill if it can be done without risk (e.g., returning the container to the upright position, closing valve, and shutting off power)
- **Provide** pertinent information to the FTL
- **Secure** any release paths if safe to do so.

10.5 Medical Emergencies and Decontamination

Medical emergencies and responses to injuries or suspected exposures will be handled as stated in Section 8.2. Decontamination of personnel and equipment is described in Section 11.2.

10.6 Emergency Communications

In the event of an emergency, the capability to summon INEEL emergency response resources to immediately notify site personnel, and inform others of site emergencies is required. Communications equipment at the task site will be a combination of radios, telephones (e.g., mobile, cellular, or facility), and pagers. Communication methods described below will be used during emergency situations.

10.6.1 Notifications

During emergency situations, the facility area director will be notified of any project emergency event. The area director will then make the required ERO notification. The following information should be communicated, as available, to the area director:

NOTE: *If the area director cannot be contacted, then the WCC will be notified of the event and the information listed below communicated. The WCC must also be told that notification to the area director and emergency coordinator has not been made.*

- The caller's name, title (e.g., FTL or HSO), telephone number, and pager number
- Exact location of the emergency
- Nature of the emergency including time of occurrence, current site conditions, and special hazards in the area
- Injuries, if any, including numbers of injured, types of injuries, and conditions of injured
- Emergency response resources required (e.g., fire, hazardous material, and ambulance)
- Additional information, as requested.

10.7 Emergency Facilities and Equipment

Emergency response equipment maintained at the project site includes the items listed in Table 10-3. The CFA facility-specific addendum to PLN-114 lists emergency equipment available at the facility. This includes the command post, self-contained breathing apparatus, dosimeters, air samplers, decontamination and first-aid equipment, and an emergency response trailer. The INEEL fire department maintains an emergency hazardous material response van that can be used to respond to an event or emergency at the project. Fire department personnel are also trained to provide immediate hazardous material spills and medical services. In addition, the CFA-1612 medical facility is manned by medical personnel to evaluate and stabilize injured personnel or those experiencing signs and symptoms of exposure.

Table 10-3. Emergency response equipment to be maintained at the project site during operations.

Equipment Name and Quantity Required	Location at Task Site	Responsible Person	Frequency of Inspection or Verification[a]
First-aid kit	Project vehicle or in support zone	HSO	Monthly: check seal only unless broken
Eyewash bottles[b] Eyewash station[b]	Bottles—at entrance to exclusion zone Station—in support zone	HSO	Monthly
Hazardous materials spill kit	Support zone	HSO	Daily verification
Extra PPE	Support zone	HSO	Daily verification
Communication equipment (operational)	Onsite	FTL	Daily radio check
Fire extinguishers[c]	On project vehicles and/or at entrance to exclusion zone and in support zone	HSO	Monthly

a. This is verification that equipment is present at the project location before starting tasks and no inspection tag is required.
b. An eyewash bottle will be used to provide an immediate eye flush if required. The location of the eyewash station will be identified by the HSO during the prejob briefing.
c. A minimum of one 10A/60BC extinguisher is required. If it is discharged, it will be returned for servicing and recharging.

10.8 Evacuation Assembly Areas and Central Facilities Area Medical Facility

Evacuation assembly areas will be conveyed during the prejob briefing. The location of the CFA medical facility is shown in Figure 10-1.

10.9 Reentry, Recovery, and Site Control

All reentry and recovery activities will follow general site security and control requirements identified in Section 7 unless conducted as part of an emergency response action. All entries to the project site performed in support of emergency actions will be controlled by the on-scene commander.

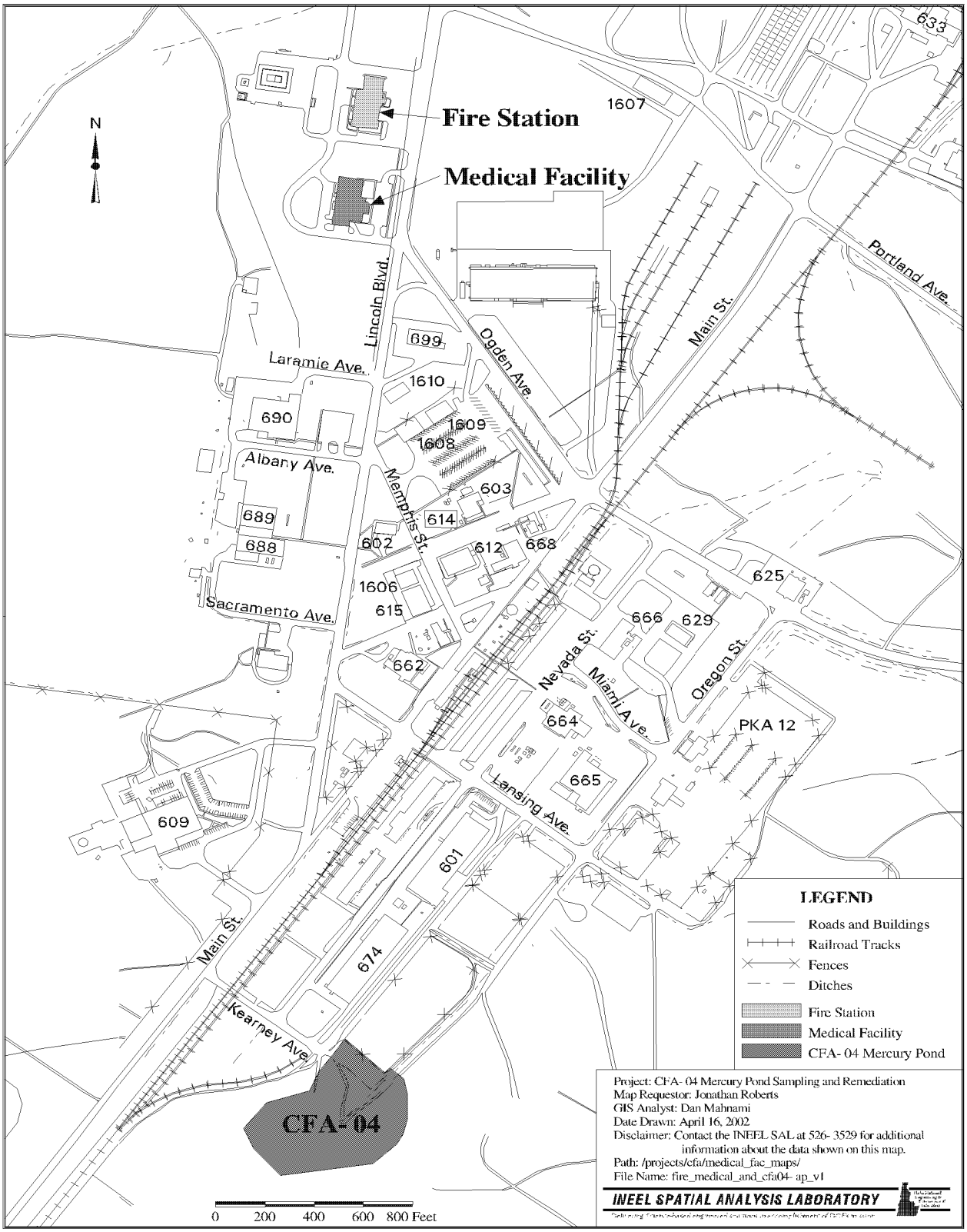


Figure 10-1. CFA-04 pond and CFA medical facility and fire station.

10.9.1 Reentry

During an emergency response, it is sometimes necessary to reenter the scene of the event. Reasons for performing a reentry may include

- Performing personnel search and rescues
- Responding to medical first-aid needs
- Performing safe shutdown actions
- Performing mitigating actions
- Evaluating and preparing damage reports
- Performing radiation or hazardous material surveys.

Reentries will be carefully planned to ensure that personnel are protected from harm and to prevent initiating another emergency event. Reentry planning is undertaken as a graded approach depending on the nature of the initiating event.

10.9.2 Recovery

After the initial corrective actions have been taken and effective control established, response efforts will shift toward recovery. Recovery is the process of assessing post-event and post-emergency conditions and developing a plan for returning to pre-event and pre-emergency conditions, when possible, and following the plan to completion. The emergency coordinator and emergency action manager are responsible for determining when an emergency situation is sufficiently stable to terminate the emergency and enter the recovery phase. The project manager, with concurrence from the area's SAD, will appoint the recovery manager.

10.10 Critique of Response and Followup

A review and critique will be conducted following all emergency events, drills, and exercises at the INEEL. In some cases, an investigation may be required before commencing recovery actions. For this reason, care should be exercised to preserve evidence.

10.11 Telephone and Radio Contact Reference List

Table 10-4 lists the points of contact for the project. A copy of this list will be kept in the FTL logbook. Because personnel listed may change frequently, working copies of this list will be generated as required to note new positions and changes of assigned personnel. This HASP should not be revised with a DAR to note these changes.

Table 10-4. Project and CFA points of contact.

Contact Title	Contact Name	Phone Number/ Radio Net	Pager Number
Warning Communications Center	—	777, 6-1515, KID-240"	—
CFA Area Director	Steve Winn	6-1075	5494
CFA Environmental, Safety, and Health Manager	Bob MacFarlane	6-8205	5712
First Aid (CFA Medical Dispensary)	—	777, 6-2356	—
CFA Facility Manager	Gary Braun	6-2830	5494
Occupational Medical Program	—	6-1596	—
Fire/Security	—	777	—
CFA-04 Project Manager	Steve Wilkinson	6-4150	9481
CFA-04 Remedial Action Construction Coordinator	TBD	—	—
CFA-04 Remedial Action Field Team Leader	TBD	—	—
CFA-04 Remedial Action Subcontract Technical Representative	TBD	—	—
CFA-04 HSO	Kerry Briar	6-5214/6-5506	6627
CFA-04 Industrial Safety	Kerry Briar	6-5214/6-5506	6627
CFA-04 Industrial Hygiene	Jonathan Roberts	6-5386	3351
CFA-04 Sampling Subcontract Technical Representative	Lori Lopez	6-4823	7678
CFA-04 Sampling Field Team Leader	Kirk Dooley	6-2068	6669
CFA-04 Sampling Team Leader	Lori Lopez	6-4823	7678
CFA-04 Safety, Health, and Quality Point of Contact	Kerry Briar	6-5214/6-5506	6627
CFA-04 Project Engineer	Doug Preussner	6-9813	6825
CFA-04 Task Lead	Deborah Wagoner	6-9989	7699
CFA-04 Regulatory Support	Michael McGuire	6-4332	6048
Environmental Restoration Safety, Health, and Quality Assurance Manager	Charles Chebul	6-9566	5689
DOE-ID Facility Representative	John Herritt	6-4981	6705

11. DECONTAMINATION PROCEDURES

Every effort will be made to prevent contamination of personnel and equipment through the use of engineering controls, isolation of source materials, contaminant monitoring, personnel contamination control training, and by following material handling requirements and procedures for contaminated or potentially contaminated materials. If contact with potentially contaminated surfaces cannot be avoided, then additional engineering controls, in combination with PPE upgrades, may be necessary to control the contact hazard. However, if chemical or radiological contamination is encountered at levels requiring decontamination, this section provides guidance on how it will be performed.

11.1 Contamination Control and Prevention

Contamination control and prevention procedures will be implemented to minimize personnel contact with contaminated surfaces if such surfaces are encountered or may be contacted during project tasks. The following contamination control and prevention measures will be employed if contamination is encountered or anticipated:

- Identify potential sources of contamination and design containment, isolation, and engineering controls to eliminate or mitigate any potential for contact or release of contaminants
- Limit the number of personnel, equipment, and materials that enter the contaminated area
- Implement immediate decontamination procedures to prevent the spread of contamination (if contamination is found on the outer surfaces of equipment)
- Use only the established control entry and exit point from the contaminated area to minimize the potential for cross-contamination and expedite contamination control surveys
- Wear disposable outer garments and use disposable equipment (where possible)
- Use hold points defined in procedures and work orders to monitor for contamination where anticipated.

11.2 Equipment and Personnel Decontamination

Personnel and equipment decontamination procedures are necessary to control contamination and to protect personnel should contamination be encountered. Both chemical and radionuclide contamination will be decontaminated from surfaces of a contaminated area at the exit and other designated work area boundaries.

The need for radionuclide decontamination is not anticipated for this project. If radionuclide decontamination operations are required for equipment or areas, they will be performed in accordance with Chapter 4 of the *INEEL Radiological Control Manual*. Nonradionuclide decontamination will be evaluated by the HSO and project industrial hygienist, on a case-by-case basis, to determine the most appropriate level of PPE to be worn. An RWP will be generated if radiological contamination is encountered.

11.2.1 Equipment Decontamination

Decontamination of sampling equipment will be conducted in accordance with TPR-6541, "Decontamination of Sampling Equipment," and TPR-6575, "Decontamination of Sampling Equipment in the Field." If contact with potentially contaminated surfaces cannot be avoided, then additional engineering controls in combination with PPE upgrades may be necessary to control the contact hazard. Heavy equipment will be decontaminated, as required, based on the source of contamination.

11.2.2 Personnel Decontamination

Mercury-contaminated soil excavation tasks will initially be conducted in Level D or modified Level D PPE unless upgrading is warranted. Engineering controls, in conjunction with project contamination prevention and control practices and proper protective clothing donning and doffing procedures, will serve as the primary means to eliminate the need for personnel decontamination. Before donning PPE, all items will be inspected, following the list in Table 5-4.

Asbestos-containing roofing material removal activities will require personnel or PPE decontamination, as outlined in 29 CFR 1926.1101. Specific decontamination procedures will be outlined in other work control documents, such as a TPR or JSA, for the different roofing material removal activities. However, at a minimum, all personnel will be required to HEPA vacuum their protective clothing and wipe down any respirators before exiting the exclusion zone.

11.2.3 Decontamination in Medical Emergencies

If a person is injured or becomes ill, that person will be immediately evaluated by first-aid-trained personnel (on a voluntary basis) at the project task site. If the injury or illness is serious, then the FTL will contact the CFA area director or WCC (if the area director cannot be reached) to summon emergency services (i.e., fire department and CFA medical services) to the project site.

Medical care for serious injury or illness will not be delayed for decontamination. In such cases, gross decontamination may be conducted by removing the injured person's outer protective clothing (if possible), and other contaminated areas may be contained with a bag or glove. If contaminated PPE cannot be removed without causing further injury (except for the respirator, which must be removed), the individual will be wrapped in plastic, blankets, or other available material to help prevent contaminating the inside of the ambulance, medical equipment, and medical personnel.

The industrial hygienist or RCT (depending on the type of contamination) will accompany the employee to the medical facility to provide information and decontamination assistance to medical personnel. Contaminated PPE will then be removed at the CFA medical facility and carefully handled to prevent the spread of contamination.

11.3 Doffing Personal Protective Equipment and Decontamination

The specific doffing sequence of modified Level D or C PPE, and any other required decontamination-doffing procedures, will be based on the nature of the contamination and specific site configuration. A general approach for doffing modified Level D or C PPE is described below. However, no one doffing strategy works for all circumstances, and modifications to this approach are appropriate if site conditions change or at the discretion of the project HSO, in consultation with the project industrial hygienist and RadCon personnel. Both radiological and nonradiological (chemical) hazards will be evaluated.

11.3.1 Modified Level D Personal Protective Equipment Doffing and Decontamination (if required)

If required to be worn, modified Level D protective clothing (e.g., disposable coveralls) will be doffed following standard radiological removal techniques (rolling outside surface inward and down) and will constitute the initial decontamination step. All PPE will be placed in the appropriately labeled containers.

11.3.2 Level C Personal Protective Equipment Doffing and Decontamination (if required)

If respiratory protection is worn in conjunction with protective clothing (e.g., Level C PPE), then the modified Level D sequence will be followed with one additional step. That additional step is to remove the respirator and place it in a separate container from the discarded protective clothing. Depending on the type of contamination encountered, this step will be followed by a radiological survey or industrial hygienist evaluation.

11.4 Personnel Radiological Contamination Monitoring

A radiological survey may be required before exiting the work zone, as determined appropriate by RadCon personnel or as stated in the RWP. If required, this survey will be conducted using an existing personnel contamination monitor or other available hand-held instrument as directed by RadCon personnel.

11.5 Site Sanitation and Waste Minimization

Site personnel will use the portable toilet facilities (if provided) or other CFA restroom facilities. Moist towelettes may be provided to allow workers to wash/wipe their hands as needed. Potable water and soap are available in the CFA facilities for personnel to more thoroughly wash their hands and face.

Waste materials will not be allowed to accumulate at the project site. Appropriately labeled containers for industrial waste and CERCLA waste (as required) will be maintained at the project site. Personnel should make every attempt to minimize waste through the judicious use of consumable materials. All site personnel are expected to make good housekeeping a priority at the job site.

12. RECORD-KEEPING REQUIREMENTS

12.1 Industrial Hygiene and Radiological Monitoring Records

When Industrial Hygiene support is required, the industrial hygienist will record airborne monitoring and sampling data (both area and personal) collected for exposure assessments in the INEEL Hazards Assessment and Sampling System database. All monitoring and sampling equipment will be maintained and calibrated in accordance with INEEL procedures and the manufacturer's specifications. Industrial hygiene airborne monitoring and sampling exposure assessment data are treated as limited access information and maintained by the industrial hygienist in accordance with *INEEL Safety and Health Manual* procedures.

The RCT maintains a logbook of radiological monitoring, daily project operational activities, and instrument calibrations. Radiological monitoring records are maintained in accordance with *Manual 15B—Radiation Protection Procedures*.

Project personnel or their representatives have a right to the monitoring and sampling data (both area and personal) from both the industrial hygienist and the RCT. Results from monitoring data will also be communicated to all field personnel during daily POD meetings and formal prejob briefings, in accordance with MCP-3003.

12.2 Field Team Leader and Sampling Logbooks

Logbooks will be maintained in accordance with MCP-231, "Logbooks." The FTL will keep a record of daily site events in the FTL logbook and will maintain accurate records of all personnel (e.g., workers and nonworkers) who are onsite each day in a site attendance logbook. Logbooks must be obtained from the field data coordinator for INEEL Sampling and Analysis Management (formerly the Sample Management Office). The completed logbooks must be returned to Sampling and Analysis Management within 6 weeks of project completion. The logbooks are then submitted to the Environmental Restoration Document Control Center.

12.3 Environmental Restoration Document Control

The Environmental Restoration Document Control Center organizes and maintains data and reports generated by Environmental Restoration Program field activities. The Environmental Restoration Document Control Center maintains a supply of all controlled documents and provides a documented system for the control and release of controlled documents, reports, and records.

Completed sample logbooks are submitted to Sampling and Analysis Management within 6 weeks of project completion. All other project records and logbooks, except Industrial Hygiene logbooks, must be forwarded to the Administrative Record and Document Control (ARDC) within 30 days after completion of field activities.

12.4 Site Attendance Record

If required to be maintained separately, the site attendance record will be used to keep a record of all personnel (i.e., field team members and nonfield team members) onsite each day and to assist the area warden with conducting personnel accountability should an evacuation take place (see Section 10 for emergency evacuation conditions). The FTL is responsible for maintaining the site attendance record and for ensuring that all personnel on the project site sign in (if required).

12.5 Administrative Record and Document Control Office

The ARDC will organize and maintain data and reports generated by Environmental Restoration Program field activities. The ARDC maintains a supply of all controlled documents and provides a documented system for the control and release of controlled documents, reports, and records. Copies of the management plans for the Environmental Restoration Program, this HASP, the Environmental Restoration Project Management Plan (PLN-694), the Quality Assurance Project Plan, and other documents pertaining to this work are maintained in the project file by the ARDC.

13. REFERENCES

10 CFR 835, 2002, "Occupational Radiation Protection," *Code of Federal Regulations*, Office of the Federal Register, February 2002.

10 CFR 835.603b, 2002, "Radiological Areas and Radioactive Material Areas," Subsection 835.603b, "High Radiation Area," *Code of Federal Regulations*, Office of the Federal Register, February 2002.

10 CFR 835.603d, 2002, "Airborne Radioactive Area," *Code of Federal Regulations*, Office of the Federal Register, February 2002.

29 CFR 1910, 2002, "Occupation Safety and Health Standards," *Code of Federal Regulations*, Office of the Federal Register, February 2002.

29 CFR 1910.120, 2002, "Hazardous Waste Operations and Emergency Response," *Code of Federal Regulations*, Office of the Federal Register, February 2002.

29 CFR 1910.132, 2002, "General Requirements," *Code of Federal Regulations*, Office of the Federal Register, February 2002.

29 CFR 1910.134, 2002, "Respiratory Protection," *Code of Federal Regulations*, Office of the Federal Register, February 2002.

29 CFR 1910.1200, 2002, "Hazard Communication," *Code of Federal Regulations*, Office of the Federal Register, February 2002.

29 CFR 1926, Subpart P, 2002, "Excavations," *Code of Federal Regulations*, Office of the Federal Register, April 2002.

29 CFR 1926.1101, 2002, "Asbestos," *Code of Federal Regulations*, Office of the Federal Register, April 2002.

42 USC § 9601 et seq., 1980, *United States Code*, "Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA/Superfund)," December 11, 1980.

ACGIH, 2002, *Threshold Limit Values Booklet*, American Conference of Governmental Industrial Hygienists.

ANSI, 1967, "Men's Safety-Toe Footwear," ANSI Z41.1-1967, American National Standards Institute.

ANSI, 1968, "Practice for Occupational and Educational Eye and Face Protection, ANSI Z87.1-1968, American National Standards Institute.

ANSI, 1969, "Safety Requirements for Industrial Head Protection," ANSI Z89.1-1969, American National Standards Institute.

DOE O 151.1A, 2000, "Comprehensive Emergency Management System," U.S. Department of Energy, November 1, 2000.

DOE O 232.1A, 1997, "Occurrence Reporting and Processing of Operations Information," U.S. Department of Energy, July 21, 1997.

DOE O 440.1, 1998, "Worker Protection Management for DOE Federal and Contractor Employees," U.S. Department of Energy, March 27, 1998.

DOE-ID, 1991, *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory,* U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; State of Idaho Department of Health and Welfare, December 1991.

DOE-ID, 1996, *Comprehensive Remedial Investigation/Feasibility Study for Central Facilities Area Operable Unit 4-13 at the Idaho National Engineering and Environmental Laboratory*, Department of Energy Idaho Operations Office, DOE/ID-10680, Rev. 1, July 26, 2000.

DOE-ID, 2000, *Final Comprehensive Record of Decision for Central Facilities Area Operable Unit 4-13*, Department of Energy Idaho Operations Office, DOE/ID-10719, Rev. 2, July 2000.

DOE-ID, 2002, *Field Sampling Plan for the Pre-Remediation Sampling of the Central Facilities Area-04 Pond (Draft)*, Department of Energy Idaho Operations Office, DOE/ID-10994, Rev. C, May 2002.

DOE-STD-1090-01, 2001, "Hoisting and Rigging," U.S. Department of Energy, April 2001.

Form 361.24, 2000, "Tailgate Attendance Roster," Rev. 2, February 2000.

Form 361.25, 1999, "Group Read and Sign Training Roster," Rev. 1, May 1999.

Form 361.47, 2001, "Hazardous Waste Operations (HAZWOPER) Supervised Field Experience Verification," Rev. 5, July 2001.

Form 412.11, 2002, "Document Management Control Systems (DMCS) Document Action Request (DAR)," Rev. 8, May 2002.

Form 432.57, 1998, "Excavation Checklist," Rev. 0, February 1998.

Form 433.01, 1999, "Outage Request," Rev. 3, December 1999.

Form 540.10, 2002, "Safety Checklist of Subcontractor Requirements for On-Site Nonconstruction Work," Rev. 13, April 2002.

GDE-6212, 2001, "Hazard Mitigation Guide for Integrated Work Control Process," Rev. 0, Maintenance Department, September 2001.

INEEL, 2001, *INEEL Training Directorate*, Idaho National Engineering and Environmental Laboratory, Bechtel BWXT, LLC, Idaho Falls, Idaho, URL: http://train1.inel.gov/index.html.

MCP-7, 2002, "Radiological Work Permit," Rev. 16, Radiation Protection Department, February 2002.

MCP-8, 2002, "Self-Assessments Process for Continuous Improvement," Rev. 6, Quality Department, January 2002.

MCP-93, 1999, "Health Physics Instrumentation," Rev. 12, Radiation Protection Department, February 1999.

MCP-137, 2002, "Radioactive Source Accountability and Control," Rev. 7, Radiation Protection Department, April 2002.

MCP-153, 2002, "Industrial Hygiene Exposure Assessment," Rev. 5, Occupational Health Department, April 2002.

MCP-231, 2000, "Logbooks for ER and D&D&D Projects," Rev. 4, Environmental Protection and Compliance Department, July 2000.

MCP-432, 2000, "Radiological Personal Protective Equipment," Rev. 8, Radiation Protection Department, July 2000.

MCP-553, 2001, "Stop Work Authority," Rev. 5, Safety and Fire Protection Department, November 2001.

MCP-584, 1997, "Flammable and Combustible Liquid Storage and Handling," Rev. 2, Safety and Fire Protection Department, February 1997.

MCP-2692, 2002, "Preventing Ergonomic and Back Disorders," Rev. 2, Safety and Fire Protection Department, April 2002.

MCP-2704, 2002, "Controlling Exposure to Heat and Cold Stress," Rev. 2, Safety and Fire Protection Department, April 2002.

MCP-2707, 2001, "Compatible Chemical Storage," Rev. 4, Safety and Fire Protection Department, February 2001.

MCP-2709, 2001, "Aerial Lifts and Elevating Work Platforms," Rev. 3, Safety and Fire Protection Department, February 2001.

MCP-2719, 2002, "Controlling and Monitoring Exposure to Noise," Rev. 2, Safety and Fire Protection Department, April 2002.

MCP-2725, 2001, "Field Work at the INEEL," Rev. 3, Safety and Fire Protection Department, January 2001.

MCP-2726, 2002, "Respiratory Protection," Rev. 6, Occupational Health Department, April 2002.

MCP-2739, 1997, "Material Handling, Storage, and Disposal," Rev. 0, Safety and Fire Protection Department, February 1997.

MCP-2743, 2001, "Motor Vehicle Safety," Rev. 2, Safety and Fire Protection Department, January 2001.

MCP-2745, 2001, "Heavy Industrial Vehicles," Rev. 1, Safety and Fire Protection Department, December 2001.

MCP-2749, 2002, "Confined Spaces," Rev. 4, Safety and Fire Protection Department, April 2002.

MCP-2750, 2002, "Preventing Hantavirus Infection," Rev. 3, Safety and Fire Protection Department, April 2002.

MCP-2859, 1997, "Posting Asbestos Advisory Signs," Rev. 0, Safety and Fire Protection Department, February 1997.

MCP-2862, 2000, "Asbestos Management Program Administration," Rev. 1, Safety and Fire Protection Department, September 2000.

MCP-3003, 2001, "Performing Pre-Job Briefings and Post-Job Reviews," Rev. 9, Operations Department, September 2001.

MCP-3449, 2001, "Safety and Health Inspections," Rev. 2, Safety and Fire Protection Department, June 2001.

MCP-3562, 2001, "Hazard Identification, Analysis, and Control of Operational Activities," Rev. 4, Operations Department, December 2001.

MCP-3650, 2001, "Chapter IX Level I Lockouts and Tagouts," Rev. 1, Operations Department, January 2001.

MCP-3651, 2001, "Chapter IX Level II Lockouts and Tagouts," Rev. 2, Operations Department, January 2001.

NFPA 70E, 2000, *Electrical Safety Requirements for Employee Work Places*, National Fire Protection Association, February 2000.

PLN-114, 2001, "INEEL Emergency Plan/RCRA Contingency Plan," Rev. 16, Emergency Preparedness Department, July 2001.

PLN-694, 2000, "Environmental Restoration Program Management Plan," Rev. 0, Project and Construction Management Department, November 2000.

PRD-22, 1999, "Excavation and Surface Penetrations," Rev. 2, Safety and Fire Protection Department, September 1999.

PRD-25, 1999, "Activity Level Hazard Identification, Analysis, and Control," Rev. 2, Safety and Fire Protection Department, June 1999.

PRD-160, 2000, "Hoisting and Rigging," Rev. 2, Safety and Fire Protection Department, April 2000.

PRD-1004, 1997, "Stop Work Authority," Rev. 0, Project and Construction Management Department, November 1997.

PRD-2001, 2001, "Personal Protective Equipment," Rev. 3, Project and Construction Management Department, June 2001.

PRD-2002, 2001, "Fall Protection," Rev. 3, Project and Construction Management Department, June 2001.

PRD-2003, 1997, "Ladders," Rev. 0, Project and Construction Management Department, November 1997.

PRD-2004, 2001, "Scaffolding," Rev. 2, Project and Construction Management Department, June 2001.

PRD-2005, 2001, "Walking and Working Surfaces," Rev. 1, Project and Construction Management Department, June 2001.

PRD-2006, 2001, "Aerial Lifts and Elevating Work Platforms," Rev. 1, Project and Construction Management Department, June 2001.

PRD-2007, 2000, "Hoisting and Rigging," Rev. 1, Project and Construction Management Department, April 2000.

PRD-2009, 1997, "Compressed Gases," Rev. 0, Project and Construction Management Department, November 1997.

PRD-2010, 2001, "Welding, Cutting, and Other Hot Work," Rev. 1, Project and Construction Management Department, June 2001.

PRD-2011, 2000, "Electrical Safety," Rev. 1, Project and Construction Management Department, April 2000.

PRD-2014, 2001, "Excavation and Surface Penetrations," Rev. 6, Project and Construction Management Department, June 2001.

PRD-2015, 2001, "Hand and Portable Power Tools," Rev. 4, Project and Construction Management Department, June 2001.

PRD-2016, 2001, "Material Handling, Storage, and Disposal," Rev. 2, Project and Construction Management Department, June 2001.

PRD-2019, 1998, "Motor Vehicle Safety," Rev. 1, Project and Construction Management Department, January 1998.

PRD-2020, 2001, "Heavy Industrial Vehicles," Rev. 2, Project and Construction Management Department, June 2001.

PRD-2022, 1998, "Safety Signs, Color Codes, and Barriers," Rev. 1, Project and Construction Management Department, January 1998.

PRD-2107, 2001, "Heat and Cold Stress," Rev. 2, Project and Construction Management Department, June 2001.

PRD-2108, 2001, "Hearing Conservation," Rev. 1, Project and Construction Management Department, June 2001.

PRD-2109, 2000, "Respiratory Protection," Rev. 2, Project and Construction Management Department, April 2000.

PRD-2201, 2000, "Flammable and Combustible Liquid Storage," Rev. 2, Project and Construction Management Department, April 2000.

PRD-5096, 2001, "Fall Protection," Rev. 0, Occupational Safety and Fire Protection, January 2001.

PRD-5098, 2001, "Scaffolding," Rev. 0, Occupational Safety and Fire Protection, January 2001.

PRD-5099, 2001, "Electrical Safety," Rev. 2, Safety and Fire Protection Department, October 2001.

PRD-5101, 2001, "Portable Equipment and Handheld Power Tools," Rev. 0, Safety and Fire Protection Department, April 2001.

PRD-5103, 2001, "Walking and Working Surfaces," Rev. 0, Occupational Safety and Fire Protection, March 2001.

PRD-5110, 2001, "Welding, Cutting, and Other Hot Work," Rev. 0, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* July 2001.

PRD-5117, 2001, "Accident Prevention Signs, Tags, Barriers, and Color Codes," Rev. 0, Occupational Safety and Fire Protection, September 2001.

PRD-5121, 2002, "Personal Protective Equipment," Rev. 0, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* April 2002.

Project and Construction Management, 2002, *Subcontractor Requirements Manual,* Rev. 27, April 2002.

Radiation Protection, 2000, *Manual 15A—Radiation Protection INEEL Radiological Control,* Rev. 6, PRD-183, July 2000.

Radiation Protection, 2002, *Manual 15B—Radiation Protection Procedures,* Rev. 103, April 2002.

Radiation Protection, 2002, *Manual 15C—Radiological Control Procedures,* Rev. 39, March 2002.

Radiological Control Department, 2002, "Radiological Control and Information Management System," URL: http://radcon.inel.gov/.

Safety and Fire Protection, 2002, *Manual 14B–Safety and Health–Occupational Health, Occupational Medical and Industrial Hygiene*, Rev. 53, June 2002.

Safety and Health Department, 2002, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection*, Rev. 93, January 2002.

STD-101, 2001, "Integrated Work Control Process," Rev. 12, Operations Department, September 2001.

TPR-6541, 2001, "Decontaminating Sampling Equipment," Rev. 2, *Environmental Monitoring Compliance Monitoring Handbook,* June 2001.

TPR-6559, 2000, "Sampling With a Hollow-Stem Auger," Rev. 0, *Environmental Monitoring Compliance Monitoring Handbook,* November 2000.

TPR-6575, 2001, "Decontaminating Sampling Equipment in the Field," Rev. 0, *Environmental Monitoring Compliance Monitoring Handbook,* May 2001.